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Editorial Notes.

Coal Situation and Selling Organizations.

Up and down the country the conditions of the coal industry are being discussed, and no end of gratuitous advice is being tendered by politicians and other amateurs as to how it may retrieve prosperity. If the industry adopted all the counsel offered to it, the issue would be a complete wrecking of what is already crippled. The Labour-Socialists affect to be uncertain as to what has brought the industry to such parlous state. One day it is mismanagement and lack of imagination on the part of the owners; another day it is the Government whose policy is to blame, and who have allowed things to drift to the present, financially regarded, melancholy position. It depends upon the platform from which they are speaking or the immediate object which of the two is given as the primary cause of the current difficulties. In the House last week, it was the Government who were responsible, and particularly the Prime Minister. But Mr. George Spencer, the leader of the new trade unionism in the mining industry, who is now strongly despised by his quondam friends on the Labour-Socialist benches, put the matter in a nutshell when he said that stoppages in the coalfields had had more to do with their troubles than anything else. That is the truth, although, of course, there are other factors in the case—such as the overmanning of the industry through the policy of the Miners' Federation, general trade depression, and the changed economic conditions, mainly through the ability of foreign countries to sell profitably their coal at a lower price than we are able to do. It is to recover our markets that coal has to be sold abroad at cut prices; and this is largely due to the prolonged stoppage of production here which gave our competitors grand opportunities. The low selling prices have, however, kept more miners employed than would otherwise have been the case; but the Labour-Socialists refuse to recognize this. All they can manage to keep within the range of mental vision is the amount of unemployment in the coal areas; but they are loth publicly to acknowledge that a not inconsiderable part of the number of unemployed represents superfluity even in a normal period.

At the same time, as the President of the Board of Trade (Sir Philip Cunliffe-Lister) suggested in the House last week, while it would be utterly wrong to minimize the difficulties of the industry, no useful purpose is served by magnifying them. A few figures from his speech are enlightening. In the ten months to October, 1925, the output of coal was 201 million tons; in the same period of this year, 210 million tons. The amount of coal exported in the ten months of 1925 was 41·8 million tons; in the corresponding period this year, 43·1 million tons. In October, 1925, the number of miners unemployed was 247,000; in October this year, 223,000. The Eight-Hour Act has reduced the working costs by 2s. 8d. per ton; while the reduction of wages per shift has been only from 10s. 5d. to 9s. 10d. per ton—a reduction of 7d., so that less than a quarter of the reduction of the working costs has come off wages. These are highly satisfactory figures, though bad reflections of the conditions—working and trading—which existed in 1913. But though the figures—as a short-period comparison, and standing alone—are satisfactory, the fact remains that the industry is not prosperous; and improvement depends on two factors—a removal of trade depression at home (which higher prices for coal will not assist), and a larger export business (which, again, higher prices will not help us to gain). The greatest hope lies in extending business, and thus securing a reduction of the average production costs. At the same time, the collieries ought not to sell, at a few shillings per ton, certain classes of coal the calorific value of which is quite good, and of which modern methods of utilization enable more profitable use to be made than was possible before.

The conditions confessedly are complicated. In some areas, the colliery owners consider that coal-selling agencies, and a compulsory paying of higher prices by certain industries—the gas industry among them—with in some cases a regulation of output, will restore prosperity. The troubles are of a fundamental order, and fundamental disorders of the kind cannot be cured by superficial treatment. Mr. Spencer, the Notts miners' leader, favours coal-selling combinations; the other members on the Labour-Socialist benches of the House and the Miners' Federation do not—on the ground that regulation of output as a means to commanding better prices will throw more men out of employment. On the other hand, it is noticed that Mr. W. A. Lee, the Secretary of the Mining Association, who knows, or ought to know, as well as any man in the country, the views of the owners, stated at a dinner the other night that he has confidence regarding the future of the industry, with schemes under consideration in many coalfields which are directed towards meeting the tendency to undue depression of prices which exists when supply and demand are not correlated. He added that the progress which has been made justifies the expression of the hope that satisfactory solutions will be found—that is, satisfactory from the point of view of the owners, which may be altogether different from the point of view of the largest consumers of coal, from that of the interests of the country itself, and from that of meeting the competition for overseas trade. There will be a loud outcry if the home industries are asked to pay more for their coal supplies than is charged for the coal sent abroad. In this connection it will be noticed that definite proposals for coal-selling schemes and output regulation have not yet been made public from the northern coal export areas, but are confined to that belt of coal areas from which the railborne supplies of London and the South are largely derived. South Wales, it is true, has adopted a selling scheme without regulation

of output; but in that case it is recognized that minimum prices will make some collieries suffer, and to compensate them it has been agreed to create a fund by imposing a threepenny contribution from every ton of coal sold. During last week there were sectional and combined meetings of the owners in South and West Yorkshire, Nottinghamshire, and Derbyshire; but no information was allowed to be published regarding the position of their deliberations or the prospects of an agreement. Nothing, however, has been said which indicates there will not be success in establishing a scheme.

Gas Lighting Progress.

LIGHTING matters have lately been receiving a large amount of consideration. Some inattentive persons have been of the opinion that manufacturers interested in gas-lighting appliances have been sick or sleeping. They have been neither the one nor the other. To this the various meetings which have been recently held at which illumination subjects have come under discussion have testified. Business is flourishing, and advance has been made in the improvement of the means for gas illumination and in their application to domestic, commercial, industrial, and public service. To see this is so, one has only to read the progress report which was prepared for a recent meeting of the Illuminating Engineering Society by Mr. H. Talbot, Chairman of the Lighting Section of the Society of British Gas Industries; and there is the material evidence of the fact in gas output when daylight fails.

The superheater form of burners, first applied to street lighting, and now produced in suitable sizes for domestic and other interior illumination, have rapidly obtained a vogue, and have opened fresh scope for the production of suitable accessories—such as diffusing glassware. They render a good account of themselves; greater economy is realized by their use; their designs are attractive. There is a marked preference for these burners fitted with two bijou mantles instead of the universal type, which, although still preponderant in use, is finding that it is gradually being shouldered-out by its smaller cognates. The bijou twin burner gives as much illumination as a universal mantle, and with a gas consumption 25 to 40 p.ct. less—a nice economy, which competitors will probably note with some disfavour. These lamps (single or multiple nippled) are definitely the opponents of the gasfilled electric lamps—not only in domestic, but in other fields of illumination.

The appetite of shopkeepers for illumination is increasing; and in some cases there is so much competition between them for more illumination that lighting engineers find it difficult to establish standards that have any degree of permanency or general adoption. The shopkeepers are looking more and more upon light from the advertising point of view; and there is a tendency to overdo this use of artificial light to the detriment of service and utility. Excessive and garish lighting may be an attraction to customers, but it is not such a convenience or aid to them in inspection and selection as a rational amount of illumination. In whichever direction requirement tends, the manufacturer of gas fittings can satisfy it. While there is a tendency to employ bigger units in shop lighting, Mr. Talbot reports that there is also an increasing application of small and handsome superheater aluminium lamps, with vitreosil globes. They are making good appeal to those who require effective illumination by neat and economical means.

In industrial lighting, it is expected that the new Factory Act will provide for adequate and suitable illumination in manufacturing establishments. But in his report for 1926, the Chief Inspector of Factories testified to a distinct improvement in lighting. Industrialists are learning that efficient lighting is a factor in output and quality, and therefore in man and works efficiency. They cannot afford to do without good lighting. There are heavy charges nowadays over which they have no direct control; lighting is one which they can regulate, and cause to be an aid, instead of an obstruction, to good results. Negligence is costly; and the manufacturer is realizing this, without an Act of Parliament, through propaganda and experience. However, if illumination is dealt with in the new Factory Act, that will be another stimulus; but who will judge "adequacy" and "suitability"—the factory inspectors? They are undoubtedly growing more intimate with the subject, and are aware that "glare" does not fall under the term "suitability," whereas "quality of light" does. "Adequacy" must be dealt with in a more general way, as standardization in light must be subject to environment, nature of work, and individual vision.

Coming to street lighting, this has been profusely treated recently at meetings of the Institution of Public Lighting Engineers, the Public Works, Roads, and Transport Congress, and now in the reports submitted at the meeting of the Illuminating Engineering Society. The consensus of opinion is that there is large scope for improvement in this regard. The "B.E.S.A." specification for street lighting has provided a foundation for much discussion, and has caused a renewal of interest in the details, the sum of which means reformation in the lighting of our streets. It all requires money; but advance in conditions must be met. Street lighting must progress at equal pace with, perhaps a little ahead of, change in the use of our roadways—particularly in respect of volume and speed of traffic. Our guardians of the peace, too, would find improvement advantageous. One contribution to the proceedings at the Roads and Transport Congress suggested that a public lighting department should be instituted for the control of the whole of London, in order to bring about a uniform lighting policy, and undertake investigations. At the meeting of the Institution of Public Lighting Engineers, it was submitted that the Road Fund would find in public lighting a legitimate outlet for some of the surplus money which the Chancellor of the Exchequer thinks it right to divert from the purpose for which it was earmarked. If the fund provided money for improved lighting, there ought to be a condition attached that those spendthrifts should be kept under control who, for no reason other than that they direct the affairs of the electricity supply, spend lavishly on converting street lighting from gas to electricity—thus giving the public a light which is not so good for the purpose, and is thoroughly unreliable, as witness the many recent collapses of supply. But with all the prodigal conversions by local authorities, instead of economical improvement by means of modern gas burners and fittings, the aggregate business in public lighting of the industry does not diminish. For public purposes the statutory gas undertakings of Great Britain in 1920 sold 6928·7 million c.ft. of gas; in 1926, 9162·7 millions. That was the coal stoppage year. In the preceding normal year, the consumption for public purposes was 9950·9 million c.ft. The electricity industry also reports that in 1926 a little check was experienced by it in this direction. We are told that the firms specializing in public gas lighting have been having a busy time preparing for the 1927-28 lighting season.

One further point for consideration is the suggestion by Mr. Talbot that, now the therm system is so largely in being, there should be a departure from the expression of so many candles per cubic foot of gas consumed to the more scientific mode—B.Th.U. per candle-power hour, mean hemispherical rating. The trouble is that the electricity industry does not like to talk much of B.Th.U., because of the slender quantity they supply for a given sum of money. We must use comparable terms.

Gas in the Next Session.

THE gas industry does not in these days provide much work for Select or Unopposed Bills Committees of the two Houses of Parliament; and the same applies to the electricity industry. The gas industry has now the Gas Regulation Act and the Board of Trade; and by the process of Special Orders, a considerable part of its requirements can be met which was formerly dealt with solely by Parliament. Much the same thing happens in respect of the electricity industry through the power with which the Electricity Commissioners are invested. Thus it comes about that at this season of the year the notices which we publish of applications to Parliament for new

or enlarged powers have been reduced to very small number—small in comparison with the long lists of pre-war years. In our issue of Nov. 30, mention was made of the notices of a dozen Bills which apply to gas supply in one or more ways. That is a modest number; and, having regard to the nature of the measures, they ought not to impose any great claim upon the time and consideration of the two Houses. But it is hoped that Parliament will be able to give attention to the general legislative proposals of the National Gas Council. That they will be readily acceptable is a fair surmise in view of the consideration which has been given to them by both the Board of Trade and the National Fuel and Power Committee.

Regarding the private measures of which notice has been given, at the moment little can be said about them, as brevity of information is a feature of all such announcements. Among them the most conspicuous Bill will be that of the South Suburban Gas Company, who are proposing to remodel and consolidate their parliamentary powers in a manner which is the natural corollary to their new relationships with the South Metropolitan Gas Company. There is a large amount of repealing of clauses in old Acts to be accomplished; adjustments of territory are to be made on the borders of the area of supply; lands on which manufacture may be carried on require extension and definition; and power is to be sought to make agreements with neighbours in respect of the supply of gas. It is proposed that the old sliding-scale shall be abolished, and that there shall be established a standard or basic price and rate or rates of dividend, with a minimum dividend incorporated, and varied basic prices in different parts of the area. The calorific power is to be prescribed; and authority is to be asked for the supply of gas of other qualities for industrial purposes. The Company desire to be exempt from, or to vary in their application to them, the provisions of the Gas Regulation Act. Financial, co-partnership, and a multitude of other proposals are included in the Bill, which, in effect, will represent a consolidation and co-ordination of powers, and, with the working arrangements with the South Metropolitan Company as effected last year, will open up a new era in the history of the Company.

Modern movement in the industry is reflected in certain of the other measures; but they are few. We are inclined to think that, when the new general legislation is passed, there will be an acceleration in extending gas-supply areas on the part of well-placed undertaking and in their absorbing the less favoured ones, and this to mutual advantage. We see the Blackpool Corporation are proposing a substantial extension of the borough boundaries, and the acquisition of certain undertakings; the Tottenham Light, Heat, and Power Company are contemplating the inclusion in their area of the Waltham and Cheshunt Company; the Bournemouth Company are also proposing to carry their business into new territory; and the South Metropolitan Company are suggesting including in their area certain pieces of the borough of Wandsworth and the urban district of Mitcham, and to extinguish the obligations and powers of the Wandsworth, Wimbledon, and Epsom District Gas Company therein. The Dover Gas Company are seeking the adoption of a basic price, and are asking for power to subscribe capital to another Company. For the rest the notices do not suggest anything out of the normal in modern gas enactment. Outside gas undertakings, the London County Council will submit to Parliament that it should be made compulsory on the part of dealers to sell coke by weight, and to make it a penal offence to water it with a view fraudulently to affect its weight. A Bill which in one respect will have to be carefully watched is that of the Middlesex and Surrey County Councils. A section deals with Thames Bridges, &c., upon which it is proposed to place certain prohibitions and restrictions in respect of gas and other mains or cables.

That is not a remarkable legislative programme; but we are hoping the session will be a notable one through the passing into law of the general legislative plans upon which the National Gas Council have been so long and assiduously at work.

Coke-Oven Industry Seeking New Business.

THE coke-oven industry is searching-out ways and means of improving its position. It has been very hard hit by the depression in the steel and iron industries, the coal stoppage last year, the decline of export business, and the fall in the value of bye-products. Upon all this, the newspapers have given prominence to a statement made by Mr. Frank Hodges, at the meeting of the Institute of Fuel, that German metallurgical coke is competing successfully with Durham coke in Middlesbrough. Naturally, there is a desire to rehabilitate the fortunes of the industry; and of late there have been several indications of movements in this direction. At the meeting of the Institute of Fuel, a paper was read by Mr. Robert Ray, B.Sc., in which he drew attention to certain lines along which the coking industry should work to this end. In some of the proposals, the gas industry has a distinct and direct interest. It is suggested that amalgamations of coking plants must be brought about, and larger batteries be erected. In this connection, Mr. Ray makes the significant statement that no central battery of ovens can be a practical proposition unless the bulk of the available high calorific value gas produced is disposed of at a satisfactory figure—either for domestic purposes by arrangement with gas undertakings, to industrial concerns, or to electricity generating stations. This shows how one economic development must bring others in its train.

The gas industry has already entered into considerable business relations with the coke-oven industry for the bulk supply of gas. Even so, the potential business is of a far larger order; and if the coking industry succeeds in improving its productive position in the manner that is desired, the scope for gas business will naturally reach much greater magnitude. But it must be remembered that demand is required as well as supply; and demand depends much upon price. A good suggestion was made by Sir Arthur Duckham in the discussion. Coke-oven managers and gas engineers, he considers, should get together, and discuss matters. Up to the present, the former do not seem fully to understand the difficulties of gas undertakings with their statutory obligations; the latter do not thoroughly appreciate (so Sir Arthur hints) the possibilities of coke-oven gas. However, the main thing, apart from price, is (as Dr. E. W. Smith said on the same occasion) guarantees as to quality and continuity. A new contract which the Sheffield Gas Company have entered into, and a copy of which Mr. Ralph Halkett appended to the paper he read at the annual meeting of the British Commercial Gas Association, shows that good advance has been made in this direction, which gives greater assurance for the future. There are also indications that the coking industry is looking for a great expansion of the means to supply gas to profitable end. It will be remembered that, at a recent meeting of the Midland Coke-Oven Managers' Association, the Chairman (Mr. C. P. Finn, of the Manvers Main Colliery) made the suggestion that a coke-oven gas grid should be constructed in South and West Yorkshire, and the Derby and Nottingham coalfields. He gave expression to the same idea at the meeting of the Institute of Fuel. He sees no reason why coke-oven concerns should not link-up and use common mains, as is done in Germany—at any rate in industrial districts—for the supply of not only gas-works, but industrial undertakings. In one case this is already being done off one main.

Domestic coke formed another point in Mr. Ray's submissions as to the means by which the coking industry could revive and extend its business. Modernization of the industry would include the installation of plant to produce carefully graded coke, which is important if the domestic smokeless fuel market is to be successfully developed. Of course, the gas industry—with some undertakings possessing at periods large accumulations of coke—will not look with any too friendly eye upon this intrusion into their smokeless fuel market by the coke-oven industry. But there are 40 million tons of raw coal still being used in domestic service, and that supplies a field large enough for the coke productions of both industries, and with considerable expansions. If the coking industry is seriously going out for a domestic market, then it is ob-

vious that it should (as Dr. Smith suggests) join hands with the gas industry in educating householders as to the value of smokeless fuel. Only by such means will there be success in displacing one solid fuel by another, where gas is not preferred. Undoubtedly, the more the aspirations of the coking industry are examined in relation to the interests of the gas industry, the more important becomes the question of organization and mutual conference.

Synthetic Nitrogen Entente.

According to a statement which appeared last Friday in "The Daily Telegraph," from its New York Correspondent, favourable progress has been made in the formation of a synthetic nitrogen entente between Great Britain, France, and Germany. The information is based on a report received from Paris.

Committed for Trial.

The hearing of the summonses against Sir Charles B. H. Soame, Bart., Robert George Harley, and Lieut.-Col. E. O. Eaton, in connection with the Chalk Fuel, Power Gas, and Bye-Products Corporation, has resulted in their being committed for trial at the next session of the Central Criminal Court, which opens on Jan. 10. Bail was allowed in defendants' own recognizances of £1000 each. The final proceedings at the Mansion House are reported in our "Legal Intelligence."

All-Electric Houses as "Refrigerators."

Some interesting communications have appeared in the "Liverpool Echo" regarding the discontent of the tenants of all-electric houses on the Walton Hall Estate. Reproductions from the letters are made in our "Electricity Supply Memoranda" this week. One correspondent describes the houses as "refrigerators," owing to the poor performance of the electric radiators.

The "Gas Salesman."

With this number of the "JOURNAL" is issued the "GAS SALESMAN." In the report of the meeting of the London and Southern Circle, will be found an illuminating contribution, by Mr. A. H. Barker, to the subject of the relative efficiencies of gas and other fuels, special reference being made to the low-temperature panel system of heating by gas. At the meeting of the Scottish Circle, Mr. James Dickson, the Engineer and Manager of the Dundee Gas-Works, addressed the members on the mutual relations of gas production and gas sales. This is printed *in extenso*.

Second Bituminous Coal Conference.

It will be seen from an announcement in later columns that Dr. Thomas Stockham Baker, President of the Carnegie Institute of Technology, Pittsburg, is spending about six weeks in Europe in February, March, and April to organize plans for the second International Conference on Bituminous Coal. The conference is to be held next November.

The Factories Bill.

Rumours have been in circulation that the Government intend dropping the Factories Bill from their programme for next session. This, it is authoritatively stated, is unfounded. The Home Office is still in conference with manufacturers with a view to rendering the provisions of the measure less onerous from the financial standpoint. At the close of the discussions with the industrialists, the Bill is to be re-drafted, and then submitted to the Cabinet, who will decide whether or not, in its changed form, it shall be retained in next year's legislative programme.

Unemployment Returns.

During the month of November, the number of persons on the registers of the employment exchanges in Great Britain has fluctuated—unfortunately, in the upward direction. On Nov. 7, the number was 1,111,700; on Nov. 14, 1,125,700; on Nov. 21, 1,126,300 and on Nov. 28, 1,145,200. This last figure is 18,946 more than the week before, but 350,867 less than a year ago, when the figures were affected by the dispute in the mining industry.

PERSONAL.

The December issue of the "Co-Partnership Journal" of the South Metropolitan Gas Company says that the agreements for supply of gas in bulk to the South Suburban Gas Company, and for co-operation in other important matters of working and administration, have now taken effect. Consequent upon the exchange of stock and upon the retirement of Sir Fortescue Flannery, Dr. CARPENTER has become Chairman of the South Suburban Board of Directors and Messrs. FRANK H. JONES, FRANK BUSH, and A. M. PADDON have joined that Board. Mr. H. GUNDRY, a South Suburban Director, has joined the South Metropolitan Board, in accordance with the terms of the agreement. Dr. Carpenter and Mr. B. R. Green have been for some time Directors of the two Companies. It will be remembered that for about fourteen years Sir George Livesey was Chairman of both Companies.

Mr. F. NAPIER SUTTON, F.I.C., F.C.S., Inspector under the Alkali, &c., Works Regulation Act (Ministry of Health) for the Eastern and South-Eastern Counties District, retires under the age limit on the 20th inst. He joined the Department (then the Local Government Board) in April, 1885, as assistant to the then Chief Inspector, the late Mr. Alfred E. Fletcher, and was appointed Sub-Inspector in 1892 and Inspector in 1908. He thus completes a service of 42 years and 9 months.

Following upon the inability of Mr. Robert H. Brown to accept the appointment which he was offered of Gas Engineer and Manager to the Town Council of Johannesburg, Mr. W. R. Herring was requested by the Municipality to re-consider the whole question, and he advised the appointment of Mr. H. M. TYSOE. The Committee having accepted his recommendation, it goes forward to the Council for approval.

An interesting ceremony took place in the Livesey Memorial Hall, Lower Sydenham, on Monday evening, Dec. 5, when Mr. W. G. WALLER, who retired in September last from the position of Chief Foreman of the Lower Sydenham Works of the South Suburban Gas Company, was presented with a gold hunter watch and a handsome silver coffee set and tray, both suitably engraved, as a mark of esteem from the employees and engineering staff of the Company. The Chief Engineer (Mr. J. Terrace), in making the presentation, mentioned that Mr. Waller had been connected with the South Suburban Gas Company for 43 years, and said he hoped that he would for many years enjoy his well-earned leisure. Tribute was also paid to Mr. Waller by the Deputy-Engineer (Mr. F. G. Gorman). Mr. Waller, in his reply, said he was glad he had so many friends in the Company. He could not find words properly to express his appreciation of the valuable gifts made to him; but he was very grateful, and on behalf of Mrs. Waller and himself tendered them his best thanks. Mr. Waller was appointed Chief Foreman in 1910, and has been an Employee Director for 22 years. Previous to his connection with the Company he was a retort-setting contractor.

Councillor H. A. RAINE has been elected Vice-Chairman of the Board of Directors of the City of Durham Gas Company, in place of the late Mr. Joseph Mawson; and the new member elected to the Board is Alderman H. E. FERENS, who is a member of a family identified with the Company almost from the latter's inception.

The annual staff dinner of the Bradford Corporation Gas Department took place on Dec. 8 at the Great Northern Victoria Hotel, when there was a gathering of about eighty, including ladies. Mr. E. J. Sutcliffe, the City Gas Engineer and General Manager, presided, and was supported by Alderman George Walker (Chairman of the Gas Committee), Councillor F. J. Cowie (Deputy-Chairman), Mr. E. Crowther (Deputy-Engineer), and Mr. Charles Wood (late City Gas Engineer and General Manager), who were accompanied by their wives. Gold watches, suitably inscribed, were presented to Mr. J. R. WAGGETT, of the headquarters office staff, and Mr. A. W. BUTTERFIELD, stores manager, to mark the completion of 40 years' service with the Gas Department by each of the recipients. Mounted umbrellas were presented to Mrs. Waggett and Mrs. Butterfield. The presentations were made by Mr. Sutcliffe, whose congratulations and expressions of good wishes were heartily endorsed by Mr. Charles Wood and by the Chairman and Deputy-Chairman of the Gas Committee.

Mr. SAMUEL SHADBOLT, Manager of the South Bank and Normanby Gas Company, has undergone a slight operation in a Middlesbrough nursing home. He is making excellent progress.

OBITUARY.

Mr. A. W. ELTON, whose retirement, owing to bad health, from the position of Engineer and Manager of the Littlehampton Gas Company was notified quite recently in the "JOURNAL," died on the 1st inst., at the age of sixty. It was in 1895 that he went to Littlehampton as Manager of the Gas Company, after having held a similar appointment at Matlock. As the years went by, the esteem in which he was held by the Directors and by all who served under him steadily developed into deep affection. Possessing a cheerful personality, he made many friends, and by virtue of his office was able on a number of occasions to render the town valuable service during labour troubles affecting the coal industry. Several times—and notably during the general strike of 1926—he was able to allow local coal merchants to replenish their depleted stocks to some extent from the Gas Company's supply; and tribute to his public spirit in this direction was paid by the Urban District Council at a recent meeting, when his resignation was conveyed to the Council. On that occasion, in expressing the hope that the amicable business relations that had always existed between them would continue with his successor, the Chairman voiced the thanks of the authority and of the town to Mr. Elton.

The Association of Public Lighting Engineers have sustained a very severe loss by the death, on the 28th ult., of Mr. H. DICKINSON, City Lighting Engineer of Liverpool. Only as recently as at the Brighton Conference of the Association in September last, Mr. Dickinson was unanimously chosen Vice-President, with a view to his becoming President at the Liverpool conference in 1929. Mr. Brocklebank, of the Manchester Corporation Gas Department, represented the Association at the funeral, conveying a wreath on behalf of the President and members. Mr. Dickinson read a paper on "Some Aspects of Liverpool Street Lighting," before the Association last year at Newcastle, and took part in the proceedings at Brighton this year. He leaves a widow and two children.

ELECTRICITY SUPPLY MEMORANDA.

THE passing of Mr. J. W. Beauchamp from the directorship of the Electrical Development Association to the position of General Manager of the South Wales Power Company, Ltd., imposed a difficult task upon the Committee who had to make selection of a successor, for it is principally the retiring Director's qualifications for the work that has made "E.D.A." such a vital and efficient organization in the work of the electricity supply industry. But the appointment that has been made is acclaimed in all quarters of the industry as a very apposite one. Lieut.-Col. W. A. Vignoles, of Grimsby, is going to take over the reins of the propaganda organization. He has had a wide and varied electrical experience, and has been a very active spirit since his advent at Grimsby in commercial development questions. He is Chairman of the Executive Committee of "E.D.A.;" and he is also Chairman of the Special Apparatus Committee of the Incorporated Municipal Electrical Association.

The New Director.

Some time ago comment was made in these columns regarding the difficulty the Liverpool Corporation Housing Committee had had in finding tenants for the all-electric houses on the Walton Hall Estate. If report informed us correctly, an alteration of the conditions of tenancy succeeded in letting the houses. Now the occupants have had experience, and there are complaints of dampness, of the cost of the electrical service, of outdoor clothes having to be worn indoors in order to keep warm, while another sufferer describes the houses as "suburban refrigerators." It will be interesting to give extracts from letters which have appeared on the subject in the "Liverpool Echo." One is signed "A. N.," and was published on Nov. 30. It says:

All-Electric Homes as Refrigerators.

> As one of the many ratepayers now established in an all-electric house, I should consider it a favour if you could spare a little space for the tenants. The first cold spell has proved that the heating facilities are not adequate, dampness appearing everywhere. This, in spite of the fact that the cost of electricity now amounts to 10s. weekly (including 2s. per week assessment). In the house I occupy there are at present several great wet (not merely damp) patches on the inside of the exposed wall of the hall, also the roof leaks in more places than one. In view of the fact that there is no coal fire to provide the necessary heat (even on the ground floor), I consider this is a matter for serious consideration by the authorities responsible. My children are never warm, except in bed, as the living room retains the little heat we get only while the door is shut tight.

On Dec. 6 "R. N. B." contributed a letter in which there was agreement with "A. N." "R. N. B." says:

> I know of seven tenants who have left within the past six months, mainly on account of there being no open fire. The electric radiator in itself is not sufficient to warm the room, and my little boy, not yet two years old, has to have his woolly coat and muffler on from morning to night to guard against the damp atmosphere. I feel certain that all tenants would appreciate an open fire in the living room.

A third letter is written by "Chili Bom-Bom;" and this is a writer who, apparently very aptly, named these houses "suburban refrigerators." The writer says:

> The letter by "A.N." is most opportune, and clearly sets forth the total inadequacy of the heating facilities in the all-electric houses. In calling attention to a few of the drawbacks of these houses, he certainly opens up a channel which may, or may not, be the means of enlightening our illustrious Corporation on the many short-comings of these suburban refrigerators, even before winter arrives. The lack of means of drying wet and damp clothes is, to say the very least, deplorable. Even household washing cannot be properly aired—the cupboard provided for the latter purpose being nothing less than a waste of good space on the landing. If everything else fails, perhaps the Corporation will serve out fur coats and provide candle diet during the winter months.

The correspondence needs no comment.

The Wayward Electric Light.

There seems to be a little bashfulness on the part of our electrical contemporaries over the lapses in supply that have occurred lately, and which have been somewhat inconvenient at a time when a propaganda campaign is running. To have the Westminster collapse, and our Houses of Parliament of all places suffering interruption of their work, was a bad prelude to the so-called National Electric Week, which actually is anything but "national" in scope. The technical papers of the electricity industry are far from proud of these performances, especially of the Westminster one; and so they have said as little about them as possible. "Meteor" in the "Electrical Times" gives an eighteen-line paragraph to the subject, in the course of which he makes two suggestions which exhibit his conviction that the commodity dispensed by the industry he serves suffers from chronic unreliability. He asks: "Should not Parliament be regarded as a place of public entertainment, and be given a stand-by supply?" And, referring to hospitals, he remarks: "We have frequently pointed out that every operating room should have a stand-by supply either from another network or from accumulators." We do not like to regard the Houses of Parliament as "a place of public entertainment," though it is so at times. However, we think with "Meteor" they should be placed in the category of buildings which should be protected against the vagaries of electricity. As to operating rooms, the most dependable lighting agent, and one always ready to hand, should not be omitted from their equipment. In this respect there should be compulsion.

Cheap Fuel and Dearer Effects.

In the paper which Sir Philip Dawson, M.P., read at the annual meeting of the Institute of Fuel, he made suggestions for cheapening electricity. Among the points submitted for producing economy is that the surplus gas of coke-ovens and steel works should be utilized for generating electricity for supply into the general transmission network controlled by the Central Electricity Board. There are two considerations against this. The first is that coke-oven gas can be used with greater advantage for domestic purposes through gas-distribution systems than under steam-boilers; and the second is that it would probably be found that the cost of firing boilers with good coke-oven gas would be dearer than coal firing at present prices. He also commented on the coal which is unworked owing to the high ash content. Such coal he recommended should be used in the form of pulverized fuel for steam-boiler firing for electricity generation purposes. Later on, he observed: "When we reflect that 40 p.ct. of the total generating costs in a modern station to-day is due to capital charges, and 40 p.ct. is represented by the cost of fuel, we see the importance of reducing these two items." It follows that, if a low-grade fuel is used abnormally high in ash, more boiler plant would be required to produce a given quantity of steam; and, further, the greater the amount of ash, the greater the labour required in cleaning the furnaces and in removing the ashes. Some of the saving in the initial cost of fuel would simply be transferred to higher expenses in other directions. If, too, low-grade coal containing a large amount of ash has to be transported any distance, the conveyance cost would be as much as that of high-grade coal of low ash content. This matter of grade of fuel for steam-raising evokes more considerations than the simple ones presented by Sir Philip. He should have a little practical experience of the performances of fine ash in boilers. We assure him it would be enlightening. Cost per

ton may be a consideration; cost per unit of effect is a greater one.

Words and Acts.

Sir Andrew R. Duncan, Chairman of the Central Electricity Board, and Mr. Archibald Page, Chief Engineer of the Board, were guests at the annual dinner of the Scottish Centre of the Institution of Electrical Engineers in Glasgow. It is a pity that Parliament and the Central Electricity Board are not of the same mind as Mr. Page. On the occasion referred to, he made this sapient remark: "Isolation of brains is all very well, but co-ordination achieves a great deal more." The "isolation of brains," when Parliament was considering the form of the Electricity Supply Bill, which developed into the Act of 1926, led to much resentment on the part of the electricity supply industry; and now the refusal of the Central Electricity Board to hold a public inquiry into the London and South-Eastern scheme has resulted in the revival of much discontent within the industry. Yet, Mr. Page says, "co-ordination achieves a great deal more." But he said something else: "The industry is co-operating with the Board in a mass attack on obsolete methods of production as a first stage to better things." An examination of the correspondence, protests, and other evidence at the office of the Central Board, and a perusal of the debate in the House of Lords when Lord Gainford called attention to the South-Eastern scheme, should cause the Chief Engineer of the Board to question the fitness of his use of the word "co-operating."

Mr. Carney on Electric Heating.

A useful article comes from the pen of Mr. H. Ambrose Carney. It is published in a recent issue of the "Electrician." We admire much in it which we know to be true; there is that in it from which we dissent. The author says that the fact that 1 KW.H. provides only 3410 B.Th.U., against an average of 500 B.Th.U. per c.ft. of gas, or 14,000 B.Th.U. per lb. of average fuel (which is a particularly high "average") has been sufficient to discourage the serious consideration of electricity as an economical source of heat. But he holds that the present accepted heating methods are so obviously inefficient that electric heating has a definite field for immediate usefulness. We hesitate to accept the suggestion that gas heating is inefficient. Efficiency from the consumer's point of view consists in the amount of useful heating work rendered for a given expenditure of money. And Mr. Carney tells us that, notwithstanding the advantage of efficient application with electricity, the general use of electrically produced heat demands the minimum price per KW.H. He finds that the heating load by ordinary electric fires combines a high maximum demand with poor diversity, and the impossibility of curtailing supply at specified hours. That it has a really bad character so far as the electricity undertaking is concerned, is shown by the following observations: "The electric fire is usually on circuit for a short time only, and at irregular intervals. Consequently, its load factor is too low to be remunerative at a reasonable price per KW.H.; and the average annual consumption of electric fires is only about 400 to 500 KW.H. per KW. connected." Even if the electric fire load could be supplied at rates which would encourage the use of electricity for the heating of rooms and buildings, it would be undesirable, since it would introduce a peak much more serious than any old-time lighting peak. These are truths; but they are uttered by an electrical man with a purpose. He advocates electric heating by low-temperature surfaces. He refers to large-scale installations in buildings, exceeding 300,000 c.ft. capacity each. Under normal conditions, and for a fifty-hour week, the average consumption is 900 to 1000 KW.H. per KW. connected. Where continuous heating is required, the maximum demand may be reduced, and the consumption may then exceed 2000 KW.H. per KW. installed. The author speaks of the disadvantages of "instantaneous" electric water-heaters; he prefers, from the point of view of the undertaking, the storage system, but not where immersion heaters are fitted in unlagged water-tanks. He is wise; householders who do not adopt electric water heating are wiser. He has not much to say regarding cooking. As to industrial heating, more experience of actual conditions and more data are needed. Careful attention should be given to the conditions of loading and operation, so as to satisfy, as nearly as possible, the requirements of the minimum tariff. We agree that haphazard development can only discredit electric heating.

Wiring Installations and Electrical Toys.

Mr. C. G. Morley New, the Electrical Engineer of Cardiff, is not disposed to remain silent regarding the danger of mishandling wiring or misusing electricity. Apparently he agrees with the view we have previously expressed that it is better to prevent (if possible) electrical accidents than that the electricity business should suffer through a lamentable occurrence. He has written to the local papers, calling attention to a letter received by the Electricity Committee from the Coroner, in which was pointed out the seriousness of people carrying out extensions to their installations without notifying the Electricity Department, and that this is likely to continue, with the possibility of further accidents, unless (Mr. New added) wider powers are given to deal with matters of this sort. The Committee decided to make representations to the competent Government Department, although it is questionable whether anything can be done without legislation. In the same letter, Mr. New referred to the danger of working electrical toys off the supply mains. We will quote what he said: "I had occasion to point out that, in a recent advertisement in the local Press, a model electric railway was being offered for sale to work off the supply mains; and I expressed the opinion that it is extremely inadvisable for the public to purchase toys of this sort without first obtaining competent advice, otherwise the apparatus may be of a type likely to be extremely dangerous to children using the toys." A couple of years ago at this time of the year Mr. New called the attention of a salesman to the fact that a cheap Continental electrical toy he was offering was dangerous. He assured him that he had not appreciated this, and decided that he would tell customers it should not be used, directly or indirectly, off the ordinary electric supply, but from batteries.

Mishaps.

On Dec. 2, the Leeds newspapers reported that just after midnight there had been a failure of the electricity supply, which deprived of illumination streets, houses, newspaper offices, and other places depending upon it. It was due to a breakdown at the generating station. Through the breakdown of two boilers at the Peterborough Corporation electricity works on Nov. 25, the supply had to be discontinued to the large power users, but report states it was restored on the 28th. The lighting supply, it is stated, was not affected. Christmas shopping was proceeding merrily in Oxford Street last Friday morning, when the buildings on the north side of the famous thoroughfare were deprived of electric light, which catastrophe lasted about half an hour. The Regent Street Polytechnic was in semi-darkness for nearly an hour. Candles were in immediate request by shops and banks; but some of the larger establishments found their stand-by plants friends in need. The provision and maintenance of such plants for safety is, of course, an expenditure which should be debited to electric lighting. The failure, it is stated, was caused by a breakdown at the St. Marylebone generating station in Richmond Street, N.W. At the meeting of the Dundalk Burial Board on the 29th inst., it was reported that a fire occurred in the mortuary chapel on Nov. 5, causing damage estimated at about £28. The fire started in an electric heating apparatus. An apprentice electrician, William Hornby, aged 16, was electrocuted at the Lytham shipbuilding yard on the 1st inst. He was assisting in carrying out some wiring work when he touched a live wire.

SECOND BITUMINOUS COAL CONFERENCE.

Dr. Thomas Stockham Baker, President of the Carnegie Institute of Technology, Pittsburg, U.S.A., expects, according to an announcement from his Institution, to spend six weeks in Europe during February, March, and April of 1928, to organize plans for the Second International Conference on Bituminous Coal at Pittsburg. The conference is scheduled for the week of Nov. 19, 1928. President Baker's itinerary will include visits to scientists throughout Europe. His European address, after Feb. 25, will be the Guaranty Trust Company, Paris.

In connection with the preliminary plans being formulated by President Baker and his associates, it is further announced that a definite decision has been made to include the subject of synthetic fertilizers from coal in the programme for the second conference. Other subjects to be considered will probably include the latest development in obtaining substitutes for gasoline from coal, power from coal, low and high temperature distillation processes, smokeless fuel, gasification of coal, utilization of coal tar products, and coal in relation to the production of fixed nitrogen.

FORTHCOMING ENGAGEMENTS.

Dec. 15.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting at the Council House, Birmingham. Paper by Mr. J. S. Hayward (Industrial Heating Section, Birmingham) on "The Heat Insulation of Materials."

Dec. 16.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute, 7.30. Paper by Mr. J. M. Loughland on "Gas-Fired Fish-Frying Ranges."

Dec. 17.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Brighouse. Paper by Mr. W. E. Stephenson, of South Bank, on "Incidentals in the Manufacture of 400 c.v. Gas." Inspection of the works.

Jan. 10.—NATIONAL GAS COUNCIL.—Meeting.

Jan. 10.—FEDERATION OF GAS EMPLOYERS.—Meeting.

INSTITUTION OF GAS ENGINEERS.

Dec. 16.—Liquor Effluents Research Committee.

Jan. 9.—Emergency Committee. Finance Committee.

Jan. 10.—Gas Education Committee.

POTENTIAL INVESTMENTS.

V.—THE LIVERPOOL GAS COMPANY.

The Liverpool Gas Company is the largest provincial gas company, from the point of view of output of gas. It has a statutory area of supply of 66½ square miles, comprising the City of Liverpol (including Woolton), the Borough of Bootle, and the Urban Districts of Litherland, Waterloo-with-Seaforth, and Great and Little Crosby. The population of the whole area is about 944,000, and the gas services number 186,300. The sales of gas for the year 1926 exceeded 7227 million c.ft., equalling, on the declared calorific value of 475 B.Th.U. per c.ft., 34,331,708 therms.

The Company was incorporated as the Liverpool United Gas Light Company by Special Act of Parliament in the year 1848, and further powers were obtained between the years 1865 and 1926; the name of the Company being changed in 1914.

The capital of the Company as shown by the last accounts is as follows :—

	£
7 p.c. redeemable preference stock	600,000
Ordinary stock—5 p.c. standard (including £848,240 added on conversion)	2,145,907
	£2,745,907
Premiums on ordinary stock	371,565
Remaining unissued	..
Making the total authorized capital	£3,117,472
	£
Loan capital—	
4 p.c. debenture stock	306,083
Mortgages	136,050
Premiums on debenture stock	30,226
Remaining unissued	662,257
Total borrowing powers	£1,134,616

The preference stock issued at par in January, 1922, is redeemable at par (*a*) on June 30, 1941, or (*b*) in whole or in part on or after June 30, 1931, on six months' notice by the Company.

Transfer arrangements, common form. No fees. All classes of stock can be transferred on same deed and in amounts and multiples of £1; smallest holding allowed (any class), £10. Husband's witness of wife's signature, or *vice versa*, not accepted. Voting—one vote for £200 ordinary stock and less than £1000; two votes for £1000 and less than £2000; three votes for £2000 and less than £3000; four votes for £3000 and upwards. Preference stock does not confer voting rights.

Accounts and Dividends: Accounts which were formerly made up to June 30 of each year have since 1915 been made up annually to Dec. 31. They are submitted in February, an interim dividend being paid in August. The preference dividend is payable on Sept. 30 and March 31.

The standard price of gas fixed by Board of Trade Order, Sept. 8, 1921, under section 1 of the Gas Regulation Act is 12⅝d. per therm; present price, 8d. per therm. Dividends on the ordinary stock (5 p.c. standard) are subject to sliding-scale —viz., ⅛d. per therm above 13d. or below 12⅝d. = ⅛ p.c. in half-year's dividend.

PROGRESS MADE BY THE COMPANY.

The following table illustrates the progress made since 1903. The period of the war and the few following years have been ignored, owing to the abnormal conditions then prevailing.

Year to June.	Average Maximum Price of Gas per 1000 C.Ft.	Quantity Sold. Million C.Ft.	Capital Expended per 1000 C.Ft. Sold.	Gross Profit.	Total Charge for Capital. (*a*.)	Rate of Ordinary Dividends. P.Ct. per Annum.	Amount Carried Forward and Balance Reserve Fund.
	s. d.		s. d.	£	£	£ s. d.	£
1903	2 8	3,580	10 9	111,717	119,727	10 0 0 7 0 0	119,189
1908	2 6	3,993	9 9	118,887	117,472	10 0 0 7 0 0	131,119
1913	2 1	4,827	8 6	104,156	116,834	10 0 0 7 0 0	156,309
Year to Dec.	Per Therm. d.	Therms.	Per Therm. s. d.			On Converted Stock. (*b*.)	
1923	8·15	30,118,325	1 8	219,330	174,510	5 10 0	276,887
1924	7·40	31,498,736	1 8	131,108	173,243	5 10 0	240,115
1925	7·85	32,290,500	1 8	175,940	175,966	5 10 0	245,922
1926	8·25	34,331,708	1 7	163,911	177,130	5 10 0	238,450

(*a*) Includes dividend and interest paid and amount (if any) carried to reserve fund.
(*b*) In the year 1914 the 10 p.c. and 7 p.c. maximum dividend stocks were converted into one class of 5 p.c. standard ordinary stock, subject to sliding-scale.

The balance standing to the credit of the special purposes fund at the end of the year 1926 was £76,273.

The progress made by the Company is remarkable. The increase in the sales of gas since the year 1903 has been over 100 p.ct., and the capital expended, which in 1903 was 10s. 9d. per 1000 c.ft., equalling on an assumed calorific value of 500 B.Th.U. (say) 2s. 2d. per therm, is now down to 1s. 7d. per therm. The high price of foreign coal in the year 1926 had an adverse effect on the profits for the year; but the substantial balance on the reserve fund (£176,900) and the amount carried forward (£61,550) are a safeguard against any reduction of dividend. With the better conditions prevailing, it is expected that the current year will disclose very satisfactory accounts. It is interesting to note that the price of gas has been reduced twice during the year, and now stands at the figure charged immediately prior to the coal dispute of 1926.

The following table shows the prices of the highest and lowest transactions in the ordinary stock on the Liverpool Exchange, the dividends paid, and the yield p.ct. per annum calculated on the average price during the past four years :

Year.	Transactions. Highest.	Transactions. Lowest.	Dividend. P.Ct. per Annum.	Yield P.Ct. per Annum on Average Price.
			£ s. d.	£ s. d.
1923	94	89	5 10 0	6 0 3
1924	94	88½	5 10 0	6 0 7
1925	94	82	5 10 0	6 5 0
1926	84½	78½	5 10 0	6 15 0

The preference stock is quoted on the London and Liverpool Exchanges. The highest and lowest prices (London Exchange) during 1926 were 103⅛ and 101 respectively. At the present price of 102, the yield is £6 17s. 3d. p.ct. During the current year the market value of the ordinary stock has risen; and the present average quotation (Liverpool Exchange) is 89, yielding on a 5½ p.ct. dividend £6 3s. 7d. p.ct.

NOTES ON NEW BOOKS.

THE HIGHER COAL-TAR HYDROCARBONS.*

Reviewed by Dr. W. B. DAVIDSON.

Dr. Everest, who is joint author of "The Natural Organic Colouring Matters," has transferred his activities to a somewhat different branch of organic chemistry in his book "The Higher Coal-Tar Hydrocarbons." A more exact title would have been "The Chemistry of the Higher Coal-Tar Hydrocarbons," as it does not deal with the distillation of coal tar, and would be of little use to the average tar distiller.

There are good books already available in which benzene, naphthalene, anthracene, carbazol, and their derivatives are systematically described, and therefore these are excluded from the volume under review. Acenaphthene and its derivatives are first discussed, and the methods shown by which the structure of acenaphthene (via 1 : 8 nitronaphthoic acid and naphthalic acid), and the positions occupied by groups entering into its molecule have been deduced. It appears that acenaphthene is isolated from the heavier oils of coal tar on a commercial scale on the Continent, but is not produced in quantity in this country. As acenaphthenequinone and its condensation products appear very promising from the point of view of the manufacture of fast vat dyestuffs, it is to be regretted that the bulk of the research in this direction has been done, until very recently, in other countries, and little in this country. Research work done on the halogen substitution products of acenaphthene is scanty, but what has been published is collected and arranged lucidly and systematically.

The fluorene or diphenylene group next receives attention. The only source of this hydrocarbon at present is the heavy tar oils remaining after naphthalene and anthracene have been separated, though fluorene-9-carboxylic acid (and from it fluorene) has been synthesized by the action of trichloracetic ethyl ester on benzene in presence of aluminium chloride. With regard to the amino-derivatives of fluorene, no systematic work has been published, though as far back as 1883 amino compounds of fluorene were claimed to be of use in the preparation of azo dyes. In view of the possibilities offered by fluorene derivatives containing at least one amino group, this lack of attention is surprising. Very few of the possible halogen substitution products have been prepared, and in other directions,

* "The Higher Coal-Tar Hydrocarbons," by A. E. Everest. Published by Longmans, Green, & Co., Ltd., 1927; pp. 334. Price, 18s. net.

such as the fluorene reduction products, available information is scanty and isolated. In this latter connection, the work of collecting published details has been made more difficult by the conflicting results obtained by different workers—the controversy over the perhydride and decahydride is an example. It would seem advisable to consolidate existing positions in these outlying fields of research before proceeding to break open new ground in the search for further knowledge. The study of the acenaphthene and fluorene groups brings us to about the middle of the book.

The remaining half of the book is concerned with the important phenanthrene group, and includes the known chemistry of phenanthrene, phenanthrenequinone, chrysene, pyrene, perylene, picene, retene, &c. Available details of the production and properties of the halogen compounds, the nitro-amino, and sulphonic acid derivatives, and the condensation products of these hydrocarbons, are given in a concise and methodical manner. Retene, which, by the way, has not been found in coal tar, but occurs in the tar of highly resinous pines, has been included because its structure places it in the phenanthrene group; and perylene is included for the same reason. The trend of much of the research work which has been done on these bodies has been towards the production of dyestuffs; and it is surprising how few compounds, especially those derived from phenanthrenequinone, have been even moderately successful.

Throughout the book references to original papers in "Berichte," "Annalen," and the numerous other scientific periodicals are given at every opportunity; and it is obvious that the work has entailed much labour and time in summarizing papers in all languages. Though this is the first edition, and the setting-up of type containing difficult technical terms is no easy task, very few printer's errors occur in the text. The second structural formula for acenaphthene on p. 1 is obviously incorrect; on p. 37, line 16, izo-oxadiazole should read iso-oxadiazole; on p. 91, line 27, fluorylhydrazone is meant; and there are several other minor errors. The occasional practice of writing inorganic terms like carbon dioxide and phosphorus pentachloride as one word is to be deplored, though such a system is generally necessary in organic nomenclature.

To summarize, the book fills a gap in the literature not only of coal tar products, but of organic chemistry also. The subject is handled in a clear and correct style, and no pains have been spared to give the latest and fullest information, with an abundance of references. Throughout the volume, the many untrodden fields available for research are indicated, and these indications show how skeleton-like in many respects is our knowledge of the chemistry of this rather abstruse subject.

Dr. Everest has given us a book which should prove indispensable to the advanced chemistry student, the organic research chemist, and the dyestuffs chemist; and he is to be complimented on the characteristically able and thorough manner in which he has completed his work.

NEW PURIFYING PLANT AT HAWORTH.

Installation by Messrs. Clapham Bros., Ltd.

For a number of years the works of the Haworth Urban District Council Gas Department (the Engineer and Manager of which is Mr. Osman White) have been noted for supplying cheap gas, and at one period of the war were sending out the cheapest gas in the country. The output has steadily increased, until last year it amounted to 63 million c.ft.

The retort house, erected in 1905 by Messrs. Drakes, Ltd., contains four settings of six and two settings of eight horizontal retorts, which are charged by a Morris hand-charging machine. The gas passes forward to a set of four annular air-cooled condensers erected by Messrs. Dempsters. There are two exhausters by Messrs. Waller & Son, each driven by a horizontal steam engine.

The wet purification plant consists of a Livesey washer by Messrs. Clapham Bros., a tower scrubber by Messrs. Clayton, Son, & Co., and a Clapham's "Eclipse" rotary ball washer scrubber erected in 1883. New purifiers have replaced a set of four boxes 10 ft. square of the water-lute type, controlled by a 12-in. centre valve, erected in 1883 by Messrs. Clapham Bros. The gas is measured by a station meter; and the pressure to the district is controlled by 12-in. and 9-in. station governors by Messrs. J. & J. Braddock. The storage comprises a two-lift wrought-iron holder by Messrs. Clayton, Son, & Co., erected in 1888, having a capacity of 110,000 c.ft.; and a two-lift mild steel holder by Messrs. Newton Chambers & Co., erected in 1898, and having a capacity 30,000 c.ft.

THE NEW INSTALLATION.

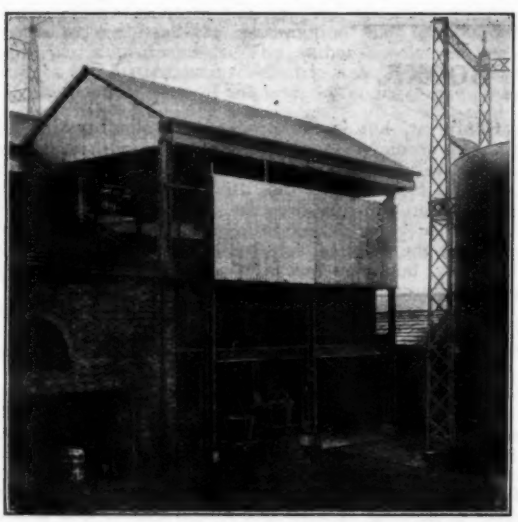
Although a comparatively small installation, the new purifying plant (which was inspected last Saturday), owing to its completeness and many special features, presents an interesting illustration of a thoroughly modern and efficient plant, accommodated on a difficult and restricted site. The whole of the work, including the foundations, has been carried out by Messrs. Clapham Brothers, Ltd., of Keighley, to designs prepared by the Council's Engineer; no effort having been spared to ensure a purifier installation of the very latest type.

The foundations comprise eleven concrete blocks; the excavations being carried down to virgin ground, which was found at depths varying from 8 to 12 ft. In two places the foundations had to be split, and mild steel box girders inserted to bridge existing mains. The revivifying floor is of mass concrete rendered in cement.

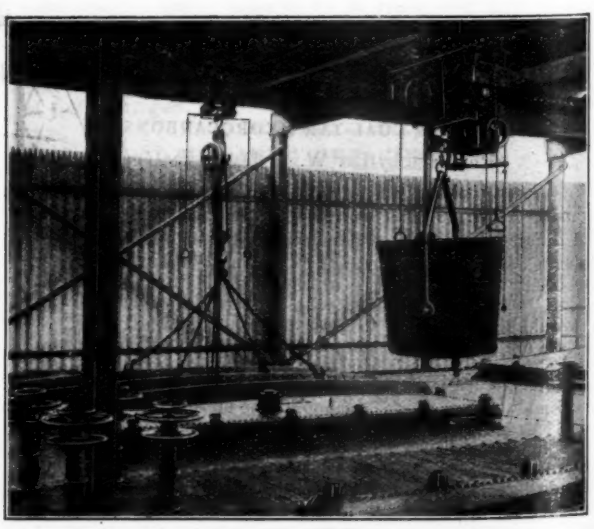
The purifier house is a mild steel structure comprising three rows of main girders carried on eleven stanchions, the bases of which are enclosed in cast-iron boxes and grouted-up to prevent corrosion taking place. The stage floor comprises eleven rows of secondary joists supported on three lines of main girders. The roof stanchions are carried up to a height of 29 ft. 6 in. above floor line, to allow sufficient working headroom for cover and oxide handling. The roof is in two spans, one being extended to cover the catch purifier. Wooden platforms are provided around the boxes, with hatchways through which the oxide skips can be raised from the revivifying floor.

The four purifiers, each 16 ft. square, are arranged in two pairs of twins, with the catch purifier separate. They are constructed of cast-iron plates, with bracketed flanges machined full width. Around each purifier is a cast-iron deck, 2 ft. wide, leaving an opening for the cover 12 ft. square. There are two tiers of grids to each purifier, supported on R.S.J. bearers.

For discharging the oxide to the revivifying floor below, 18 in. diameter chutes are fixed in each purifier. These extend below the purifier bottom, and are fitted with self-sealing lids

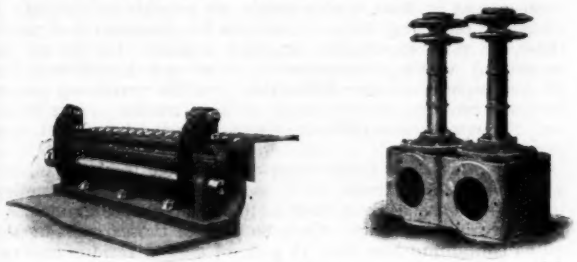


The New Installation.



The Purifier Deck.

and fasteners, and, as a precautionary measure, with padlocks and chains. Internally the chutes are removable for convenient discharging. The purifier covers are of the dry-lute type, substantially constructed in mild steel, well crowned, and have suitable external and internal stiffeners. They are fitted with Clapham's patent "Eclipse" rubber joints, and are held in position by Clapham's patent "Triumph" fasteners. These are a development of the older type eccentric fastener, originally introduced by the same firm, and over which they have many advantages, the chief being that they do not depend on



Clapham's Patent "Triumph" Cover Fasteners and Valves.

a frictional grip, but have a positive lock, and, although adjustable, are so constructed that the rubber joints cannot be over-compressed. These fasteners are attached to the purifier cover, and do not form any obstruction on the deck plates.

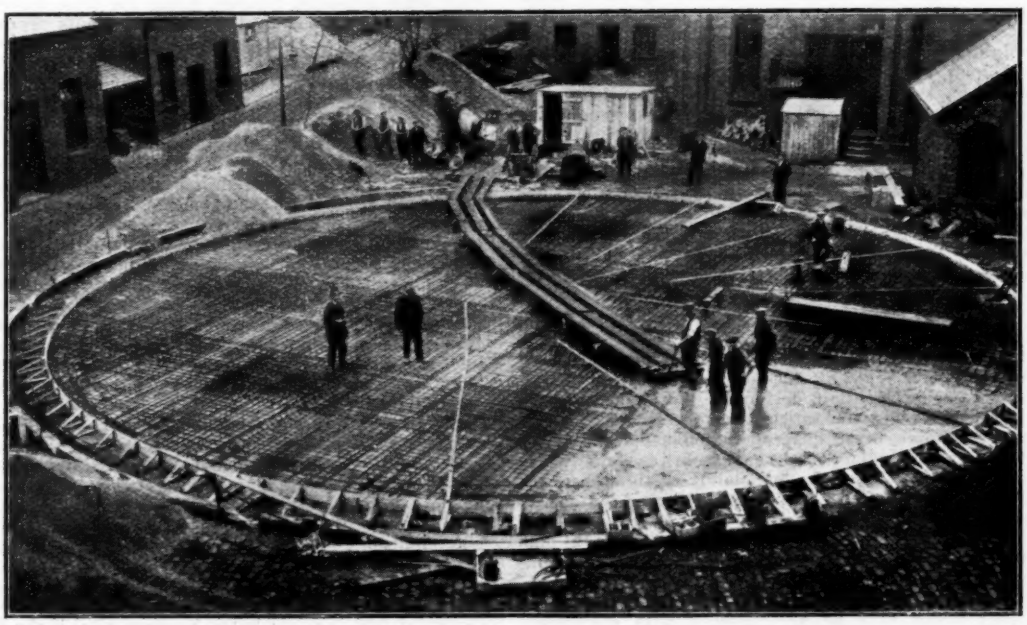
The purifiers are worked by means of a set of eight of Clapham's patent "Triumph" valves, and the catch purifier by means of an ordinary by-pass arrangement. The "Triumph" valve permits a full-series working of the four purifiers—*i.e.*, any two, three, or all four boxes can be worked in rotation, commencing any box first. These valves are unique, in so far as whichever setting is in use, the valve faces are not exposed to the action of the gas. The columns of the valve project to a convenient height above the floor, and are fitted with suitable indicator plates. The valves lend themselves to a very compact arrangement of connections; and actual opening or closing is practically instantaneous.

A runway system for handling both covers and oxide is fixed to the underside of the roof joists, and extends over the centre line of each set of boxes, with an intermediate connecting member and the necessary junction switches.

For lifting and moving the covers, a 30-cwt. worm-geared pulley block with slings is used. This is attached to a ball-bearing carriage of the swivelling bogie type.

For oxide handling, a ½-ton ball-bearing travelling electric pulley block of the bush-travel type has been provided, suspended on a flexible bogie trolley for negotiating the junctions. The block is of robust construction throughout, designed in accordance with "B.E.S.A." regulations, and is complete with automatic electric brake and overwinding switch. There are four points of electrical contact situated one at each end of the twin boxes; each contact comprising three lengths of copper wire supported by mechanical ears carried from brackets attached to the track girders. The trolley can pass right through the points of contact without any possibility of flashing, as the hoist is electrically "dead" unless the controller is actually being operated. There are two steel tipping skips, each of 13½ c.ft. capacity, together with two sliding wheel trucks for operating on the revivifying floor. The skips, when filled, are raised through the hatchways provided; and the oxide may be deposited in any part of the purifiers.

GASHOLDER TANK CONVERSION AT HYDE.



An interesting scheme of conversion has recently been carried out for the Hyde Gas Company, by Mr. J. Brabbs, the Engineer.

The capacity of the existing tar and liquor tanks having become inadequate (they afforded only six or seven days' storage at periods of maximum production), it was decided to dismantle an obsolete gasholder, and to convert the tank for use as a tar and liquor tank. Various proposals for the conversion were considered, and that submitted by Messrs. Firth Blakeley, Sons, & Co., Ltd., of Church Fenton, in conjunction with Messrs. K. Holst & Co., ferro-concrete specialists of London and Leeds, who had carried out a similar conversion elsewhere, was adopted by the Directors.

The old tank is of brick construction, 72 ft. in diameter and 30 ft. deep, with a slightly humped bottom of brick and concrete. An examination of the walls showed them to be in perfectly sound condition, and it was therefore not considered necessary to line them with concrete. In view of the fact that the gasholder occupied most of the yard space, it was thought desirable to make the cover of the tank sufficiently strong to carry heavy traffic. It was therefore constructed as a ferro-concrete flat slab 9 in. thick, supported upon 16 ferro-concrete columns, with enlarged column caps set at 15 ft. centres each way, and designed to carry any number of fully-loaded steam lorries, each weighing 15 tons, with an allowance of 50 p.ct. for impact, or, alternatively, for a distributed load of 400 lbs. per sq. ft., whichever gave the worst effect at any particular point. The flat slab, besides being more economical than the older type of beam and slab construction, has the additional advantage that it affords a flat surface to the underside of the roof, without any projecting beams whatever, and is therefore much less exposed to the action of fumes. Exposed steelwork is, of course, entirely absent.

The roof is covered with a 2-in. wearing surface of concrete made with granite chippings, treated with silicate of soda to render it especially hard and durable. The columns and bottom of the tank were similarly treated with silicate of soda, to harden the surface and add resistance to attack by the tar. The scheme has the dual advantage that, while the capacity for the storage of tar and liquor is very greatly increased, the removal of the old holder from the centre of the yard effects a much-needed improvement in space, and by allowing steam wagons to load at any point obviates the necessity of stacking coke.

The work of removing the old holder and guides was undertaken by Messrs. Firth Blakeley, Sons, & Co.; and Messrs. K. Holst & Co. themselves carried out the ferro-concrete work to their own design. The photograph shows the reinforcement in the roof in place and ready for concreting.

AMERICAN GAS ASSOCIATION.

NOTES FROM REPORTS AND PAPERS.—First Article.

The Ninth Annual Convention of the Association was held in Chicago, from Oct. 10 to 14, when a very full programme was carried through. This was the first convention of the entire industry, which is now united as a whole as a result of the amalgamation of the Association with the Natural Gas Association of America. The meetings took place in the Stevens Hotel.

Rate Structure.

In the "Journal" for Nov. 2 and Nov. 16 we published the lengthy report of the Rate Structure Committee, which shows that the gas industry of the country is moving away from its long-standing practice of doing business on average rates, and is rapidly adopting new principles of charge. In fact, the work of years by the Committee is now bearing fruit.

Steam and Power Engineering Practice.

In accordance with precedent, the report of the Water Gas Committee, the Chairman of which is Mr. Henry Fink, of the Detroit City Gas Company, is under three divisions—the Operators' Section, the Uncarburetted Water Gas Section, and the Builders' Section. The first-named section contains a report on the subject of steam and power engineering practice which has been prepared with the idea of presenting to the managers of small gas-works the ways and means of economy in boiler room practice and steam and power units. In connection with water gas plants, the cost of boiler fuel, boiler labour, and power represents from 10 to 15 p.ct. of the holder cost of gas, so that serious consideration of these items is amply warranted. The development of the Back Run and Chrisman Cycle, with their reduction in amount of fuel consumed during the blast period, has reduced the quantity of steam developed in waste-heat boilers per 1000 c.ft. of gas made; but even with these cycles in operation, the waste-heat boiler gives savings well worth the investment. The steam accumulator has taken its place as a vital part of water gas plant operation; and the Committee urge careful consideration of this apparatus as a means to lower holder cost. Prior to the installation span accumulator, a steam survey of the plant should be made, so as to determine what steam-driven apparatus should deliver exhaust steam into the accumulator system. The use of an accumulator raises the back pressure on the exhaust steam header, and increases the live steam consumption of the units so connected. It is therefore very important that no more units should be connected to the exhaust steam system than are necessary to supply the exhaust steam demands. Boiler room equipment, exhausters, boosters, and compressors, and pumps and miscellaneous apparatus are also discussed, after which there is a discussion of electric drive *v.* steam drive on a large oil gas plant.

Mechanical Generators.

About two years ago, the engineers of the United Gas Improvement Company, realizing the advantages of continuous operation in water gas making, designed a mechanical generator; and after observing the satisfactory operation, from the mechanical standpoint, of an experimental installation, it was decided to erect a permanent generator in a plant which operated a single set. Since the installation of the apparatus, however, the company for whom it was built have been able to negotiate an attractive contract for the purchase of coke oven gas, the result of which was a curtailment of the original plan to have the mechanical generator in continuous operation. The plant has only recently been started-up; but the results obtained, even on intermittent operation, have demonstrated the great savings which may be accomplished with mechanical generators. Practically all the clinker is removed without shutting-down the generator; and only one half-hour out of each twenty-four hours is consumed in dumping the small amount of ash which accumulates in the hopper bottom of the generator. The water gas set on which the mechanical generator is installed is completely equipped with hydraulic operation and automatic control; and therefore the entire working in the generator house is handled by one man. The major portion of this man's time is occupied in general supervision of the apparatus, reading meters and gauges, &c. The mechanical generator, with a waste-heat boiler, makes a very desirable combination for steam production for gas making. In addition to increased gas production, a further source of steam supply, and a marked reduction in labour, another advantage of the mechanical generator is the small percentage of coke or carbon in the ash. Figures indicate that this is only 2 p.ct. of the entire material removed.

Water Gas Tar Emulsions.

The surprising extent to which emulsion troubles have invaded the water gas industry of late has been emphasized by the investigations of a Sub-Committee appointed to consider this matter. A questionnaire was replied to by nearly fifty of the larger water gas producers. The Committee, however, found the result somewhat disappointing, as it appears not only possible, but probable, that the emulsions will be formed, to some extent at least, under nearly all possible conditions. Of all plants reporting, 60 p.ct. use coke for generator fuel; and of these, 68 p.ct. experience emulsion trouble. Of the 20 p.ct. employing varying mixtures of coke and bituminous coal, 78 p.ct. report emulsion difficulties; and the remaining 20 p.ct., who use bituminous coal alone, all have trouble of this character. Thus emulsion difficulties were reported by 78 p.ct. of all plants operating.

The replies show conclusively that no field produces oil from which emulsion cannot be formed. They also indicate that lower gravity oils are at least as liable to produce emulsions as those of higher gravity. Only 80 p.ct. of those reporting their oil as containing less than 1½ p.ct. of carbon residue also notified emulsion trouble; while all those using oil with greater carbon content than 1½ p.ct. have emulsions to contend with. All plants reporting a standard of less than 500 B.Th.U. also reported emulsion troubles; the same was true of all plants reporting a standard of 600 B.Th.U. or more. The greater number of replies came from plants operating on a standard between 500 and 600 B.Th.U.; and of these 78 p.ct. reported emulsions. Classified according to the oil used per 1000 c.ft. of gas, the percentage of plants experiencing trouble is as follows: Less than 2 gallons, 100 p.ct.; from 2 to 2½ gallons, 85 p.ct.; from 2½ to 3 gallons, 79 p.ct.; more than 3 gallons, 89 p.ct. The results failed to show any definite connection between emulsion trouble and superheater heats, though it is a fact that all the plants reporting heats of 1500° Fahr. or over experience emulsion trouble; while the least difficulty in this respect was reported by the group of plants operating at the lowest superheater temperatures. Only 71 p.ct. of those whose superheater temperatures average below 1375° Fahr. report trouble from emulsions, as against 78 p.ct. of all plants. This, however, is somewhat contradictory to other data obtained.

Of the 78 p.ct. reporting emulsion trouble, 32 p.ct. state that the difficulty has been entirely overcome, though only two methods of doing this were found successful by more than one company. The more popular of these two methods was the raising of the superheater heats, and maintaining them uniform; the other was to change the grade of oil used. Raising the heats is the only method reported as stopping the formation of emulsion where bituminous coal only is employed as generator fuel.

It appears that there are at least two sources of emulsion that are more or less independent of each other—the oil used to enrich blue gas, and bituminous coal when used as generator fuel. It seems highly probable that the combination of these two factors produces the most serious situation, and the one most difficult to meet. As to under-cracking of the oil as causing emulsions, the report states that, since the cracking is done in the carburettor, and the function of the superheater is to "fix" the gases formed by the preliminary cracking, it would appear that the temperature at the top of the carburettor is more important than that at the base of the superheater. The fact that this is not universally recognized may explain why emulsions are usually encountered when bituminous coal is employed as generator fuel. That it is of the utmost importance to control the conditions which affect the cracking of the oil, if emulsion is to be avoided, is true no matter what generator fuel is used; but it becomes vital if the fuel is bituminous coal. The conditions which affect the cracking process are numerous; but the following brief instruction to the operator will, if followed, go a long way towards the elimination of emulsion: "Watch the temperatures and heat distribution at the top of the carburettor."

The following suggestions are offered: Keep the carburettor bricks clean, if this can be done by proper regulation of conditions. If not, change them frequently. Keep the top brick at least as hot as those farther down in the chamber. If this is impossible, remove one or more courses until the top course can be maintained as the hottest of the series. Keep the oil spray in proper working conditions at all times. Keep the oil free from water, and the rate of input as low as possible under existing operating conditions. Most plants have either insufficient separating capacity or separators of adequate size but of improper design. The only plant using bituminous generator fuel to report no emulsion trouble had at least twice the normal separating capacity—the plant being arranged to permit of frequent cleaning. Further, it is important that the liquid containing the emulsion-forming constituents should be kept as hot as practicable while in the separating system. The value of keeping separators clean should be emphasized. It is advised that condensate from drips, holders, condensers, &c., be kept separate from the tars and oils removed from the separators. Further, it has been suggested that a frequent cause of emul-

sion is the water leakage in condensers; and it is advised that those suffering from emulsion trouble should examine their condensers for water leaks.

A Grate Poker.

A grate poker for water gas generators introduced by the Semet-Solvay Engineering Corporation, of New York, is made of cast steel, and is provided with a cap of heat-resisting alloy. It is erected vertically in the ashpit; the tip being level with the grate when the poker is not in use. The operation is hydraulic; and whenever the generator fuel bed is in need of equalizing, the simple turning of a four-way lever handy to the operator sends the poker directly upward through the heart of the fuel bed. As it rises, the poker first breaks-up the clinker. Then it opens-up the centre of the fuel bed where small pieces of coal or coke have concentrated. This breaking and opening process crowds fuel against the side walls, closing passages around the edge of the shell; blow holes which start at the combustion zone are closed; and ring clinker is prevented from forming. Not only has the poker been found of great assistance in clinkering, but after the clinker has been removed it will break-up the fuel bed, and bring it to a homogeneous condition before proceeding with the run.

A gauge with five indicators reveals to the operator the exact position of the poker at all times while inside the fuel bed. No additional expenditure is required to reinforce a generator which is to be equipped with the poker. There is no added strain upon the shell, since the process is merely one of equalization. At no time does the poker offer any resistance to the blasts, either of air or of steam. It is hollow, with openings on the top and sides. In fact, when the poker is raised into the fuel bed at the moment of blasting, it facilitates the operation; for it offers a passage into the very centre of the fuel bed. In this respect, it really constitutes an elevated extension of the grate area.

The "A.B.C." Self-Clinkering Generator Base.

The self-clinkering generator base, or self-cleaning grate, of the Western Gas Construction Company, which was described and illustrated in the paper read by Mr. C. A. Cunnold, of the Gas Light and Coke Company, before the Southern Association of Gas Engineers and Managers earlier this year (see "JOURNAL" for April 13, 1927, p. 123), has been installed at the works of the Chicago Bye-Product Coke Company and at the River Rouge plant of the Detroit City Gas Company; and it is being put down at Baltimore and Minneapolis. The only moving part in the generator is the breaker beam, which is revolved very slowly. The beam is hollow, and is water cooled. Being out-stroking, it gradually works the ashes and small clinkers to the outside, where they are crushed between the beam and a crusher ring. Some of the ash and clinker works down through slots; but the greater part is pushed to the outer edge into an ash ring, from which it is removed by ploughs. The crusher ring is water cooled.

Two concentric chambers under the grate constitute another feature of the generator. The inner chamber is for the passage of gases, and is about 2 ft. less in diameter than the inside of the generator. It was found that restricting the gases to the limits of the inner chamber deters them from concentrating along the walls, and maintains a uniform fire. The outer chamber is for the ashes removed by the plough, and is closed to the flow of gases. With a flat bottom generator, the total time required for ash removal and other inspections has averaged about three-quarters of an hour a day; but with a cone bottom generator, it is estimated that this will be reduced to about a quarter of an hour a day.

DRY OXIDE PURIFICATION.

By J. W. THOMPSON, of Barnoldswick.

[A Paper before the Manchester District Institution of Gas Engineers, Nov. 24.]

The subject treated in this paper has not been much in the limelight for some years; and, in reviving interest in it, I do so on entirely new lines, which, I trust, will prove beneficial to the industry. It is usual on these occasions to allow the author of a paper a fair amount of latitude; and I shall probably avail myself of this privilege in several parts of the paper.

The first thing to which I desire to draw your attention is the fact that during recent years, while many valuable papers have been given by members upon other important phases of gas manufacture, dry oxide purification as described in this paper has never, to my knowledge, been considered by the Institution before. We are, therefore, in reality breaking new ground—a thing which seems almost impossible when one realizes the number and variety of papers given yearly.

It is reasonable to suppose that, for some years, it has been the custom to accept certain methods of purification as being the "correct thing." If so, one can understand the very little change during the last twenty years. I do not wish to infer that the methods generally in use during the years gone by have not given good service; but we cannot lose sight of one thing—that on many occasions oxide purification has failed, and the failures, I believe, have been largely due to an excess of moisture in the prepared oxide.

In introducing dry oxide purification, I make no apologies for the hundred-and-one things I have left out—some purposely, because I take rather a different view from many of my friends in this sense. The object of a real live business is to deliver the goods; and I am sanguine enough to believe that I shall deliver the goods in this paper. If I do not, I sincerely hope it will not be due to any fault of mine.

It is opportune at this juncture to say a few words with regard to the water content of new oxide. Without stretching a point, you will agree with me that our education with regard to moisture in new oxide has been liberally provided for in every way. We have had full measure, sometimes overflowing. This reminds me of a paper read this year at the June meeting in London of the Institution of Gas Engineers, recommending the drying of coke, which at most does not contain more than a miserable 10 p.ct. of moisture, whereas in real ripe new oxide the saturation level is somewhere about 50 p.ct.

I am aware of the fact that all I say now will probably be used as evidence against me at a later period; but, as I am living in the hope of a good discussion, I shall welcome it.

Attached is a schedule of purification costs covering a period of fifteen years for the works I have had the honour to control for nearly a quarter of a century. The schedule will go far to convince some of the members of the revenue efficiency of dry oxide. We all know how dear to the heart of a Yorkshireman is that hoary fetish or fungus "cost;" and you will pardon me if I mention that this craving is encouraged by Lancashiremen, and, perhaps, in a much smaller degree, by our colleagues farther north.

Purification Costs for Fifteen Years.

Year Ended March 31.	Gas, Annual Make.	Expenditure.			Income.		
	Millions.	£	s.	d.	£	s.	d.
1912	57·6	46	19	4	27	16	6
1913	63·2	79	7	2	26	17	1
1914	71·9	60	1	8	7	5	0
1915	76·2	77	19	10	42	14	6
1916	81·5	163	18	9	181	19	8
1917	75·8	100	5	9	257	7	11
1918	81·4	98	4	7	237	14	10
1919	80·5	157	13	7	110	14	2
1920	96·6	203	13	10	71	7	11
1921	110·3	273	15	9	366	7	0
1922	105·8	87	15	4½	225	0	0
1923	118·4	220	8	10	164	12	10
1924	111·6	210	0	7	31	1	2
1925	120·7	246	10	7½	28	7	5
1926	128·9	227	4	7	91	12	0
Totals	1380·4	£2254	0	3	£1870	18	0

	£	s.	d.
Expenditure	2254	0	3
Income	1870	18	0
Cost	£383	2	3

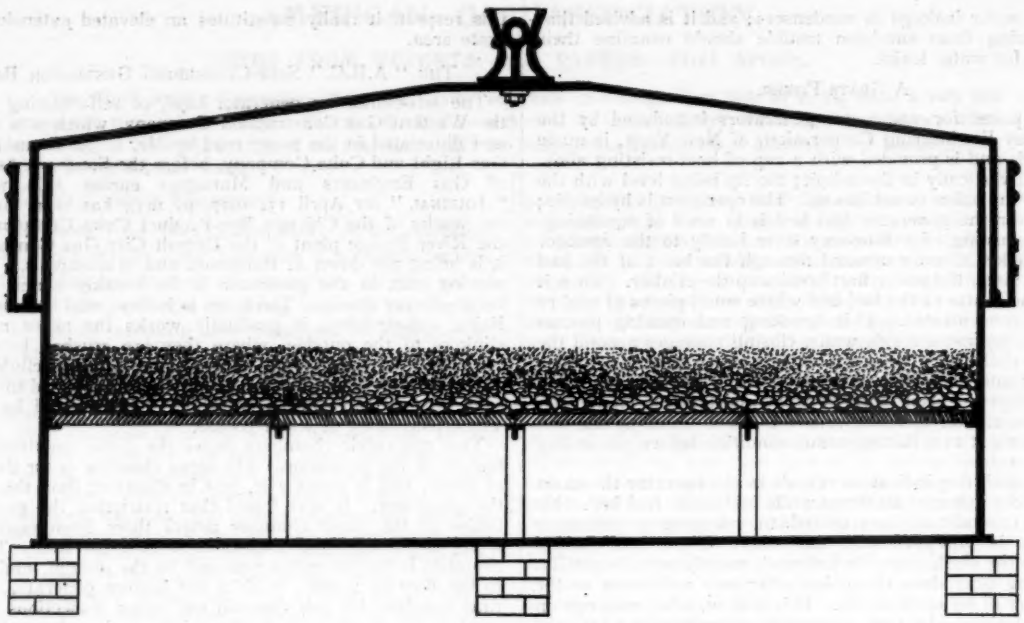
Actual cost for 15 years, £383 2s. 3d., which equals £25 10s. 10d. per annum, or 5s. 6½d. per million c.ft.

Under expenditure, the following items are included: Labour and cartage, new oxide, and grids, tee irons, and tools. The income is derived from spent oxide and old material sold as scrap. An alternative to saying the cost of gas purification is so much per million c.ft. is to take its equivalent in gas at (say) 3s. 6d. per 1000 c.ft. The actual cost of purification at this rate does not in our case equal the value of 2 c.ft. per 1000 c.ft. of gas made. It is almost, if not wholly, impossible to control the working conditions of any gas-works, or even an experimental plant for that matter, to so fine a margin, because the slightest increase in back pressure would make a greater difference than 2 c.ft. per 1000 c.ft.

Before leaving this part of the paper, it is also well worth noting that the result of back-pressure above the normal (by normal I mean the pressure usually thrown by holders and other parts of the plant) is an immediate reduction in the make of tar; and even so small a quantity as a pint per ton of coal carbonized would equal our cost of purification. I mention this because some of my friends pride themselves on never changing a purifier except for back-pressure, and they are equally certain that purification costs them next to nothing.

I frankly admit that, after many years of careful investigation, I am unable to say how much more gas and tar could be produced per ton of coal, were it possible to maintain lower and constant pressure.

Our sales for 1926 were 19·8 gallons of tar and 78·5 therms



SECTION ON A B No.1. PURIFIER.

per ton of coal carbonized. The calorific value of the gas was 500 B.Th.U. For about twenty years no water has been added to oxide at our works. On the contrary, it has been our practice to bring down the moisture content in the prepared oxide to not more than 2½ p.ct. Experience has taught us that the watering of oxide is unnecessary, and reduces its efficiency. There is enough moisture carried in the gas to the purifiers without any addition; and to add water is like carrying coals to Newcastle.

It may be within the experience of many present that, after changing a purifier, the revivified material is too sluggish, and will not "take hold." This is likely to occur during cold or damp or frosty weather; but it will never happen if the oxide is properly dried before being placed in the purifier, even though it may contain 50 p.ct. of sulphur.

Of late years much has been said in favour of the drying of gas; and where dry oxide is in use, it will be found to be an excellent drier of gas by increasing condensation in the purifiers. This condensation will vary from 0·3 to 1 p.ct.; and it is unnecessary to point out that this process costs nothing, being the result of the system. To any of my colleagues who may adopt dry oxide purification, it will come as a happy surprise to find that the nuisance created when changing a purifier will be almost entirely absent, and the conditions of the men who do the work will be considerably improved, provided that the condensers, scrubbers, and washers through which the gas passes to the purifiers are in efficient working order.

In the sectional sketch of No. 1 purifier, the oxide first placed on the grids consists of nodules varying from ¾-in. to 1-in. cubes. These cubes are obtained by screening the oxide through a rotary screen of ½-in. mesh. A layer of about 2 in. in depth is spread over the grids, to prevent the dry oxide from creeping or falling through. The layer of nodules does not give any back-pressure, but forms a kind of a honeycomb, so that the finest oxide can be used with entire confidence and success. It may be taken for granted that the larger the superficial area of the purifiers, the less the back-pressure with the same depth of oxide.

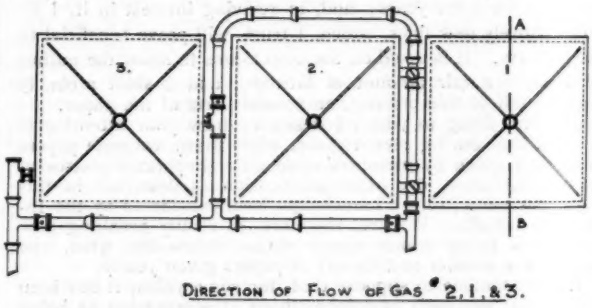
Referring again to the same sectional sketch, it will be noticed that only one tier of grids is shown. For this there is a very good reason. We never have more than one layer of oxide in each purifier, and the depth will vary from 9 to 18 in. For example, in the summer our maximum daily make is about 350,000 c.ft., and during this period we use layers 9 in. deep. When we reach our maximum winter make of 600,000 c.ft. per day, the depth will have been increased to 18 in.

Before leaving this part of the subject, it is well to note that our usual practice is, in the first instance, never to put in layers of a greater depth than 6 in., and gradually to increase the depth by 3 in. at a time when desirable. This method can be used in cases where time will not allow of a complete change, and it will prove very effective.

The other sketches showing the flow of gas are self-explanatory except as to the method of working. In our case we revivify the oxide as much as possible *in situ;* and the process is briefly as follows: The flow of gas is changed every hour in and out of Nos. 1 and 2 purifiers, and Nos. 3 and 4 remain the catch boxes. The No. 4, which is placed some distance away from the purifying house, is not shown on any sketch.

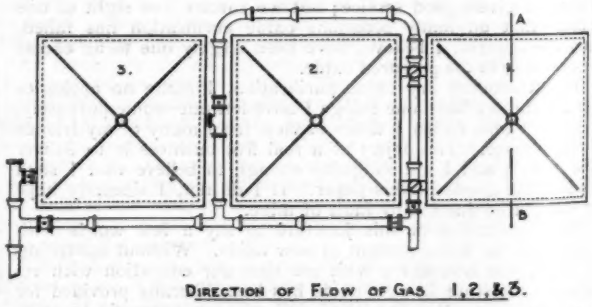
The changes are recorded on a pressure register. Air is admitted at the inlet and outlet of the condensers, and this supply varies from 1 to 2 p.ct. of the volume of gas being made. The percentage of air required can only be obtained from actual working conditions.

SIZE OF PURIFIERS 15' x 15' x 5'.



DIRECTION OF FLOW OF GAS 2, 1, & 3.

SIZE OF PURIFIERS 15' x 15' x 5'



DIRECTION OF FLOW OF GAS 1, 2, & 3.

Though we revivify the oxide *in situ*, we have never had the slightest trouble from overheating, nor has any oxide fired after being emptied. We usually start to empty a purifier at 7 a.m. with three men, and in five to six hours it is emptied and filled again. The spent oxide is thrown out on the floor the same day, and left a day or two. Any lumps are lifted by hand and dropped on the floor, when they invariably break up easily. On an average we empty thirty purifiers in one year.

Thoroughly to revivify the oxide, it is passed once or twice through the rotary screen, and is then ready for use. To turn the oxide over is not so effective as screening, because, when screened, the material is made lighter, and revivification is much more rapid, and time is often the deciding factor of purification.

In conclusion, may I say that the preparation of the paper has been a real pleasure to me, owing to the many memories it has recalled of experiments in purification carried out during my connection with the gas industry.

ENTERPRISING ADVERTISING IN AUSTRALIA.

After all!
when you realise
that more than 184,000 Melbourne and suburban homes are using gas stoves,
that more than 13,000 Melbourne and suburban homes installed gas stoves last year,
that there are more than 1000 stoves, 500 gas water heaters, 150 gas fires and 200 gas wash coppers installed regularly in Melbourne and suburbs on an average month in and month out
that in an age of "up-to-dateness," and in the face of vigorous competition, gas is more popular to-day than at any stage in the history of the gas industry,
you will appreciate
that GAS -
after all
the Dependable, Practical and Economical Domestic Fuel,
and that all gas appliances, whether for domestic or industrial use, have stood the stern test of long usage.
That familiar land
Ask your Gas Company to show you the latest heat-regulated gas stoves and automatically-controlled gas water heaters.

Gas -
the cooking medium for over 184,000 Melbourne and suburban families.
Practically every resident of the Metropolitan area enjoys gas-cooked food.
Differ as widely as they may in politics, amusements and occupations, Melbourne residents stand on common ground when it comes to a Dependable, Practical and Economical domestic fuel.
During the last three years 45,000 Melbourne and suburban homes installed Gas Stoves, showing clearly the public's estimate of gas as an essentially modern fuel.
Whilst in Australia the gas consumption has increased by 80 per cent. in the last ten years, the most astonishing development has taken place in the United States of America where, in the same period, the consumption has more than doubled, and new gas consumers are being added at the rate of 400,000 yearly.
Gas -
the servant of progress to-day——
the domestic and industrial fuel of the future

These advertisements (full pages) appeared in all the Melbourne daily papers on Sept. 28 and Oct. 1; the latter date being the closing day of a well-organized Electrical Exhibition The significance of the words "After all!" will be appreciated, for that advertisement appeared on Oct. 1; but both advertisements were designed to reassure patrons of the exhibition that gas was still "up-to-date," the number of current new installations proving its growth in popularity. The cost was approximately £1000 The Companies co-operating in this enterprise are the Metropolitan Gas Company of Melbourne, the Colonial Gas Association, Ltd., and the Brighton Gas Company, Ltd.

GLOVER-WEST VERTICALS AT ALTRINCHAM.

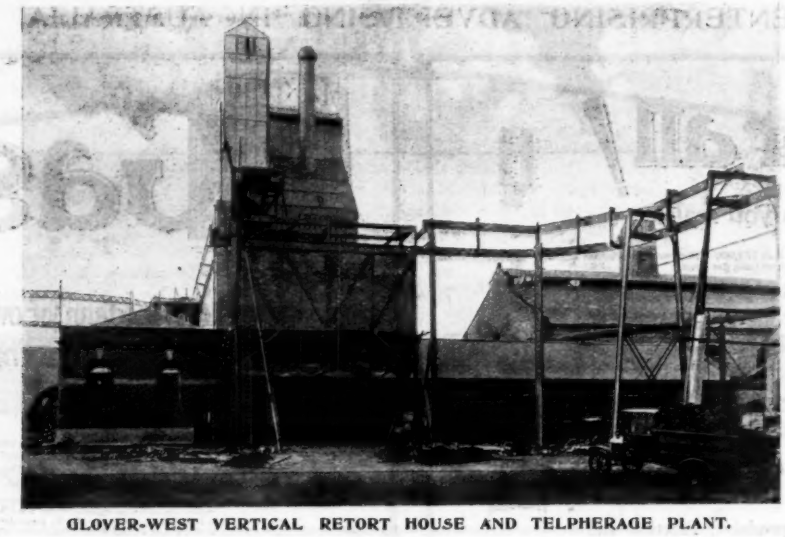
INAUGURATION CEREMONY AT THE MOSS LANE WORKS.

On Wednesday, Dec. 7, a new Glover-West vertical retort installation at the Moss Lane Works of the Altrincham Gas Company was inaugurated, in the presence of a large company, among whom were representatives of the local governing bodies in the area served by the Company. This area includes Altrincham, Hale, Bowden, Timperley, Baguley, and Dunham Massey, and has a population of about 40,000.

GENERAL VIEW OF ALTRINCHAM GAS-WORKS.

The Altrincham Gas Company can point to a long record of steady progress. In 1900 the quantity of gas sold was 145 million c.ft.; while last year it reached 357 millions. The policy of the Directors has been consistently go-ahead. They have never hesitated to instal new plant to secure low manufacturing costs and a low price for the sale of gas. Before the war, gas was sold at 2s. 3d. per 1000 c.ft. The present price is 3s. 0½d. It is confidently anticipated that the new plant inaugurated will result in still further economies.

In 1915 hand stoking was replaced by stoking machinery with coal and coke handling plant. Twelve beds of horizontal retorts, 22 in. by 16 in. by 20 ft. long, were constructed in silica segments, charged and discharged by a Jenkins-De Brouwer combined machine. A few years later a Tully total gasification



GLOVER-WEST VERTICAL RETORT HOUSE AND TELPHERAGE PLANT.

plant was also installed; and it proved of considerable value as an emergency plant during the recent coal stoppage.

THE NEW INSTALLATION.

This plant is now supplemented by continuously operated vertical retorts on the Glover-West system, of which the first instalment is brought into commission. It consists of eight Glover-West vertical retorts of the 40-in. "New Model," for an estimated daily production of 600,000 c.ft. of gas at a declared calorific value of 450 B.Th.U.

The vertical retort installation is erected in an existing retort house, the walls of which have been extended to the necessary height by means of steel framing with brick panels. The retorts (which are constructed of silica segments) and the bench brickwork, buckstays, and bracing, together with top and bottom fittings of the retort bench, are of the standard Glover-West design. The bench is provided with two producers of the step-grate, open type, each of sufficient capacity to supply fuel gas to four retorts.

The waste gases from the retort setting are collected in a common flue connected to a steel brick-lined chimney designed to facilitate the introduction of a waste-heat boiler at a later date. The coke extractors are driven, through the standard reciprocating gear, by Crossley horizontal gas engines in duplicate.

COAL AND COKE HANDLING PLANT.

The coal from the railway wagons is discharged by an electrically driven rotary wagon tippler into a coal receiving hopper. This machine, which was manufactured by Messrs. Strachan & Henshaw, is capable of handling wagons up to the 10-ton size. It consists of two substantial steel rings arranged to rotate upon four rollers, two of which drive the tippler by frictional contact. The wagon is run on to a truck-table consisting of two rolled steel joists, with bridge rails firmly braced and secured to a swinging cradle which is suspended from the rings by heavy steel links. No clamping is required. The swinging cradle is so suspended that when the wagon is partly tipped the weight is transferred to the main rings by the motion of the links. The rotation of the tippler is effected by a 12-H.P. electric motor. The wagon is run in and out of the tippler and completely discharged in a cycle of from three to four minutes.

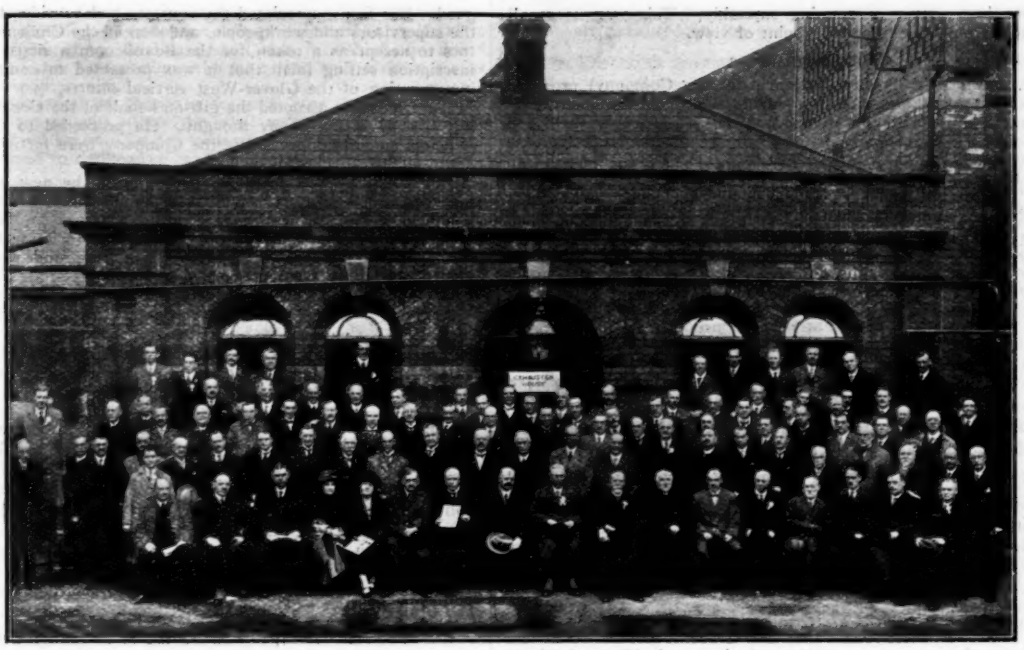
The coal receiving hopper has a capacity of 10 tons, and is arranged to receive the coal as discharged from the wagons. Three sides are formed by the sloping sides of the concrete pit; the fourth side is built of substantially braced steel plates, and the sloping cone terminates in a single outlet fitted with a sliding door through which the coal passes to the boot of a fixed-bucket elevator. This elevator delivers coal to a West coal breaker of the two-roll type, with chutes arranged so that the breaker can be by-passed if the coal supplied is small enough.

The coal, having been reduced to the size suitable for carbonization, is passed to the boot of a second fixed-bucket elevator, by means of which it is raised and delivered into the coal storage bunkers above the retort bench. Both elevators are fitted with the West stamped-steel renewable bushed chain. The buckets are bolted to lug links suitably pitched and supported upon sliders which run up and down steel angle belts with renewable wearing strips; the whole being braced together to form substantial steel frames. The primary elevator is driven through gearing from the 14-H.P. electric motor, which also drives the coal-breaker; and the secondary or broken coal elevator is independently driven from a 10-H.P. motor.

The coke from the coke chambers of the several retorts is discharged into wagons which are wheeled to the lift, elevated, and wheeled to the firing doors of the producer furnaces, or elevated to the level of a gantry for transport to the storage hoppers in the yard. These hoppers have a total capacity of 50 tons, and are divided into three compartments for the reception of three grades, into which the coke is separated by the rotary screen which is arranged above the battery of hoppers. They are constructed in steel framing, filled in with 4½-in.

[From a photograph by the Aerial Photo Company, Manchester.

ALTRINCHAM GAS-WORKS SEEN FROM THE AIR.



THE VISITORS ON THE WORKS.

brickwork set in cement mortar, with cones of steel plates protected by 1-in. hard split-bricks. The hoppers are supported on the one side by the coal store wall, and on the other by 8-in. steel joist columns at a convenient height above the yard level to enable coke to be discharged into railway wagons.

Coke to the storage area in the yard is discharged from the coke chambers into a telpher skip carried upon a steel-framed hand carriage, which is wheeled to a point where it can be dealt with by the existing telpherage plant. The telpher track has been extended, so that coke can also be taken from the hoppers to the yard.

The lift is of the electrically-driven, direct-coupled design, of a specially robust type developed by Messrs. Etchells, Congdon, & Muir, in collaboration with West's Gas Improvement Company, for use with installations of their Glover-West vertical retorts.

Power is generated by two dynamos of 50 and 27 KW. capacity respectively, direct-coupled to "National" gas engines of 75 and 44 H.P.

Auxiliary Plant.

The condensing plant consists of eight annular air-cooled condensers, 28 ft. 6 in. high and 3 ft. outside diameter, through which the gas passes in two streams; and a water-cooled tubular condenser of 1½ million c.ft. daily capacity. The exhausting plant is in two units of 50,000 and 60,000 c.ft. hourly capacity respectively, direct-coupled to steam engines. The wet purifying plant consists of two tower scrubbers, 9 ft. diameter by 55 ft. high, and a Holmes washer-scrubber of 1,000,000 c.ft. daily capacity. Dry purification is effected in six boxes, 28 ft. by 27 ft. 2 in. by 6 ft. deep, with luteless lids and the gas inlet at the top. Four boxes are operated from a centre valve, and the other two, used as catch boxes, from ordinary valves. The original centre valve, which was arranged to give three boxes in operation and one off, has been reconstructed so that all four boxes can be worked at the same time.

There are two station meters, one of the standard wet type for an hourly throughput of 30,000 c.ft., the other of the rotary type of 60,000 c.ft. hourly capacity. The latter is so designed that the same casing can be used to take registering apparatus to deal with 100,000 c.ft. per hour. Gas storage is provided by two holders, each in three lifts; the top lift flying beyond the framework when fully extended. Their combined capacity is about 1,300,000 c.ft.

Inauguration Ceremony.

A tablet inserted in the wall of the retort house records the names of the Chairman of the Company (Mr. W. W. Baker), the Deputy-Chairman (Mr. T. Fairhurst), and the Engineer and Manager (Mr. H. R. S. Williams), and that the installation has been erected by West's Gas Improvement Company, Ltd., Engineers, Manchester.

In unveiling this tablet, Mr. Baker said that, owing to the very large demand for gas, it had become necessary to enlarge the carbonizing plant; and the Directors decided that the best plan was to instal vertical retorts. After obtaining estimates from many people, they accepted the tender of West's Gas Improvement Company; and, in his opinion, that firm had made a very good job of the installation.

After the unveiling, Mr. Fairhurst started-up the plant; and the operation was watched by the visitors, who also inspected other parts of the works. Subsequently, over a hundred guests were entertained by the Altrincham Gas Company at luncheon, in the Unicorn Hotel—Mr. BAKER presiding.

The toast of the Altrincham Gas Company was proposed by Mr. J. KAYLEY (the Mayor of Altrincham), who said they had seen how well the Directors of this highly efficient and well-managed Company were keeping abreast of the times. Altrincham was fortunate in that its gas supply was controlled by a Board of local gentlemen who, while they had due consideration for the shareholders, were equally concerned for the well-being of the town. Some of the Company's officials had served the ratepayers in various capacities. A few years ago, Mr. Baker held the Chairmanship of the Urban District Council, and he had also been Mayor of Altrincham. He had been a faithful servant of the public for a number of years; and though no longer a member of the Local Authority, he was always ready to give others the benefit of his extensive knowledge and wide experience in all matters affecting local government. Of course, there was a very close connection between the Company and the local governing body of Altrincham; and he was sure Mr. Baker and his colleagues were exceedingly anxious that the relationship between the two should always be of the friendliest character. The Company had kept pace with the ever-growing demands of the district; and that morning they had seen that the Directors were determined to produce gas under conditions that could not be surpassed. As the Mayor of the Borough, he congratulated them upon the initiative and enterprise displayed in the extension of the plant, and trusted the Company would have even greater success in the future.

The CHAIRMAN, replying, said the Altrincham Gas Company, its Directors, and officials were public servants. It was a Company having statutory rights and also statutory obligations, which were carefully looked after by the Councils in the district. They maintained the gas supply during the whole period of the coal stoppage last year, though on several occasions they were very near failing. He took the opportunity, on behalf of the gas undertakings in Lancashire and Cheshire, and also of the gas consumers, to express their deep gratitude to Mr. J. H. Sillitoe, the Secretary of the National Gas Council for the district, for the kind assistance he gave during that time. He worked very hard. In the last full year, the Altrincham Gas Company carbonized over 25,000 tons of coal, and produced 392 million c.ft. of gas. There were 8500 consumers, of whom 4000 used slot meters. Cookers and grillers numbered 8800; while gas fires and heaters were estimated at 4000. The authorized capital was £182,000, and the amount issued £137,395. The figures for 1927, when completed, would show an increase over 1926. Of the 670,000 street lamps in Great Britain, 87 p.ct. were gas and 13 p.ct. electric.

Mr. C. H. SYERS (a Director of the Company) proposed "The Local Authorities and the Visitors," which was replied to by Mr. W. G. BIDDLE (Chairman of the Altrincham Urban District Council).

Mr. W. M. CARR, of Stretford, also responded. He said he acted as Gas Examiner for the Altrincham Urban District Council; and in the whole course of his duty in that capacity, since the Gas Regulation Act was adopted in 1922, there had not been one report against the Company, who had always performed their statutory obligations. In fact, they had given much more than they were bound to give—a very wise proceeding. The interest of the consumers was the first consideration. He wanted to congratulate the contractors who had erected the new installation. Visiting Altrincham in the course of his duties, he had seen how the work had progressed, with an expedition which surprised him. The work started in March

last; the plant was now running smoothly. This was no small achievement from the engineering point of view.

THE CONTRACTORS.

Mr. T. FAIRHURST (Deputy-Chairman of the Company) proposed "The Contractors," and said that during the year over 2000 appliances had been sold by the Company, whose books were still full to overflowing with orders. It was because of the large increase in the consumption that the new installation had been erected. In erecting the new installation, the contractors had carried out their motto, "Correct in principle, perfect in detail;" and he specially commended the manner in which Mr. Shadbolt had discharged his duties as engineer-in-charge.

Mr. FRANK WEST, replying, said the policy of the Altrincham Gas Company had been to go ahead; and the putting-in of the new installation was a step forward. He believed the results would be good. His firm appreciated the courtesy and consideration shown to the supervisors and workpeople, and desired the Chairman and Directors to accept as a token for the Board-room a silver tray with an inscription setting forth that it was presented to commemorate the inauguration of the Glover-West vertical retorts.

The CHAIRMAN accepted the gift on behalf of the Company, remarking that it was a happy thought. He proceeded to propose "The Officials and Staff," and said the Company were fortunate in having a thoroughly loyal staff.

Mr. H. R. S. WILLIAMS, responding, said the new installation involved great alterations; and in carrying out the work which became necessary, he had had the whole-hearted co-operation of the staff. He wished to pay tribute to the late respected Manager, Mr. J. E. Lamb, to whose foresight, ability, and wisdom a large measure of the present prosperity was due.

Mr. J. ROBINSON also replied to the toast.

GAS ACTS FOR 1927.

The number of Private Acts having a direct bearing upon gas undertakings which have been placed upon the Statute Book as the result of the work of the last session of Parliament is not large; but a review of their provisions reveals some interesting features. The main proposals of the Bills were set out in the issues of the "JOURNAL" for Jan. 5 (p. 34), Jan. 12 (p. 83), Jan. 19 (p. 145), and Jan. 26 (p. 190); but, of course, in some respects alterations have been made in the measures since that time.

BIRMINGHAM EXTENSION.

This is an Act to extend the boundaries of the City of Birmingham. Originally it was proposed to extend the boundaries to include the whole of the urban district of Perry Barr; but the Bill was subsequently amended so as to provide that only part of the urban district shall be included (the West Bromwich Corporation having also promoted a Bill providing for the inclusion of part of the urban district of Perry Barr within the West Bromwich boundaries). The boundary between the county of Warwick and the county of Stafford is to be so altered that the city shall be wholly situate in the county of Warwick.

[*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

BOGNOR GAS LIGHT AND COKE COMPANY.

The Act extends the limits within which the Company may supply gas so as to include the parish of Middleton and part of the parish of Climping. The whole of the latter parish was included in the Bill as originally drafted. Section 4 of the Littlehampton Gas Act, 1909, is to read as if the part of Climping referred to in the Bognor Act had not been included within the limits of the Littlehampton Act; and all the powers and obligations of the Littlehampton Gas Company with reference to the supply of gas otherwise than in bulk within this part of Climping are to cease. If after the expiration of five years from the passing of the Act the Company have not laid down mains for the supply of gas in Middleton or the added part of Climping, the local authority or any company or person may apply for an Act or Special Order for the purpose of doing so. The Bognor Company may charge for gas supplied within the parish of Midleton a price exceeding by not more than 0·6d. per therm that at the same time being charged by them for a supply in like circumstances and for similar purposes within the urban district of Bognor and the parishes of Felpham and Bersted as existing before the passing of the Act of 1908. Within the added part of Climping, the price is not to exceed by more than 1·2d. per therm the Bognor charge. The Company may specify sizes and material of consumers' pipes and fittings. To the clause headed "Gas fittings let for hire to remain property of Company" have been added the words: "Provided that such fittings are marked or impressed with a sufficient mark or brand indicating the Company as the actual owners thereof." A clause giving powers to lay pipes for ancillary purposes has had added to it the following: "Provided that no such main pipe or culvert shall be laid down in any street without the consent in writing of the authority in whom the control or management of the street may be having been first obtained; but such consent shall not be unreasonably withheld, and any difference arising between the Company and such authority shall be determined by arbitration in manner provided by the Arbitration Act, 1889." The Company may contract for the supply and purchase of gas in bulk.

Electricity clauses extend the limits of supply so as to include, among other places, the borough of Arundel; and the name of the Company is changed to the Bognor Gas and Electricity Company. The Company may raise additional capital not exceeding £100,000—the figure of £150,000 was inserted in the original Bill in error. The money may be raised by ordinary or preference shares or stock; but the Company are not to issue any share of less nominal value than £10. The standard dividend on the ordinary stock is to be 5 p.ct., and the dividends on the new consolidated stock and the preference shares are not to exceed 7 p.ct. and 6 p.ct. respectively. The borrowing powers are one-half of the capital issued after the passing of the Act; and power is given to issue redeemable preference shares and debenture stock, and to appoint a managing director or managing directors. A maximum charge of 2s. was named in the Bill for special meter readings to suit the convenience of consumers of gas or electricity. In the Act it is stated that the charge shall not exceed 1s. for each reading taken within the urban district of Bognor, and 2s. elsewhere than in the urban district.

In the Act the following clause appears which was not in the original Bill:

Works below High-Water Mark not to be constructed without consent of Board of Trade.—

The Company shall not under the powers of this Act construct on over or under the shore or bed of the sea or of any creek bay arm of the sea or navigable river communicating therewith below high-water mark of ordinary spring tides any work without the previous consent of the Board of Trade to be signified in writing under the hand of one of the secretaries or assistant secretaries of the Board of Trade and then only according to such plan and under such restrictions and regulations as the Board of Trade may approve of in writing under hand as last aforesaid and where any such work may have been constructed the Company shall not at any time alter or extend the same without obtaining previously to making any alteration or extension the like consent or approval. If any work be commenced altered extended or completed contrary to the provisions of this Section the Board of Trade may abate and remove the same and restore the site thereof to its former condition at the cost and charge of the Company and the amount of such costs and charges shall be a debt due from the Company to the Crown and shall be recoverable as a Crown debt or summarily.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

COMMERCIAL GAS COMPANY.

The terms of the Bill were fully set-out on p. 34 of the "JOURNAL" for Jan. 5 last; and it came before the Unopposed Bills Committees of both the House of Lords and the House of Commons. The calorific power of the gas to be supplied by the Company is fixed by the Act at 475 B.Th.U, Should the Company at any time desire to supply gas of a different calorific value, they shall give notice of their intention by advertisement in the "London Gazette" and in writing to the Board of Trade, the London County Council, and the Council of each metropolitan and county borough within or partly within the limits of supply, *and to each consumer of gas supplied by the Company*. The words printed in italics have been added to the Bill as originally drafted. The minimum pressure of gas in any pipe having an internal diameter of 2 in. or upwards is to be not less than 2 in.—the words "except in the case of accident, alterations, or repairs," which appeared in the Bill, have been deleted. Section 9 appears in somewhat modified form.

The Act fixes a basic price and dividend; the former being 11d. per therm. In the Bill 11·4d. was asked for; but as the result of negotiations, the Company agreed to amend this by substituting for it the figure of 11d. The clause of the Bill (section 12 (5)) permitting the Directors out of the funds and revenue of the Company to distribute among the employee copartners a minimum of 3 p.ct. on salaries and wages is omitted from the Act. The following section in the Act (inserted at the instance of the Board of Trade) was not in the original Bill:

Provisions relating to Basic Price.

(1) The Company shall from time to time file for public inspection with the local authority and with the Board of Trade statements of the conditions under which they are prepared to grant discounts on prices charged by them. Any such discounts granted by the Company shall be alike under the like circumstances.

(2) No sum shall be (1) divided in excess of the basic rate or carried to the reserve fund and (2) paid to the co-partners in respect of any period in which the price charged to the ordinary consumer is equal to or more than decimal four of a penny per therm in excess of the basic price.

(3) The Company shall in each year send to the Board of Trade with the accounts required under section 15 of the Act of 1920 a statement showing the number of therms sold at each

of the several net prices during the year to which the accounts relate (including gas supplied to public lamps), and if thereafter requested by the Board shall also furnish to the Board all such other information relevant to the said matters as the Board may require.

(4) The accounts of the Company for each year shall contain such particulars as will enable the local authority to calculate the amount which may be for such year (1) paid as dividend or transferred to the reserve fund and (2) paid to the co-partners.

The Company shall not later than in the session 1932 promote a Bill in Parliament proposing a revision of the basic price fixed by this Act, or giving an opportunity for such revision to be made. This is a modification of the Bill as drafted, in which the session 1937 appeared as the latest time for promoting such a Bill. The section relating to power to borrow has also been altered, and now reads:

Power to Borrow.—

(1) The Company may subject to the provisions of this Act but without the certificate of a justice of the peace at any time raise by borrowing on mortgage of their undertaking or by the creation and issue of debenture stock in respect of their capital issued at the date of the passing of this Act any sum or sums not exceeding in the whole (including the amount borrowed by the Company before the said date and outstanding at that date) five hundred and seventy two thousand and seventy-seven pounds being one-half of the paid-up capital (including premiums) issued at that date.

(2) The Company may in respect of any ordinary shares or stock or preference shares or stock issued by them after the date of the passing of this Act raise by borrowing on mortgage of their undertaking or by the creation and issue of debenture stock any sum or sums not exceeding in the whole one-half of the amount (including premiums or allowing for discounts as the case may be) which at the time of the borrowing or of the issue of the debenture stock has been raised by the issue of such ordinary shares or stock or preference shares or stock but no sum shall be borrowed in respect of money so raised until the Company have proved to a justice of the peace under the fortieth section of the Companies Clauses Consolidation Act 1845 that the amounts payable in respect of such shares or stock at the time issued together with the premiums (if any) realized on the sale thereof have been fully paid up.

The Directors are empowered, with the sanction of a majority of the proprietors, to put in force a scheme to permit of one or more, but not exceeding three, of the employee co-partners becoming Directors of the Company. The qualification of an Employee Director shall be fixed by the scheme for the time being in force; but such a Director shall have been not less than seven years in the constant employ of the Company, and shall for not less than twelve months prior to his appointment have held in his own right a minimum of £50 (nominal) of ordinary stock. If any Employee Director ceases to hold at least such an amount of stock, he shall cease to be a Director. The Directors so appointed will be in addition to the number referred to in the Company's Act of 1875. The fees to be paid to an Employee Director for his attendance at meetings of the Directors shall be fixed by the scheme, and shall bear some proportion (to be so fixed) to the amount of the qualification, not being less for each attendance than his ordinary day's pay nor more than four times that amount. There are provisions for the appointment of a Managing Director or Managing Directors.

There are provisions as to construction and placing of pipes, &c., to enable the Company to ensure a satisfactory supply of gas to the consumers; but a clause of the Bill which gave powers to lay pipes for ancillary purposes has been deleted from the Act. The prohibition of building without reasonable notice over the Company's mains or apparatus is altered by the addition of the words "nothing in this section shall affect the erection or extension under statutory powers in that behalf of a building or structure by a railway company." Railway companies are also (except in the case of a dwelling house) removed from the operation of the clause giving the Company power to take action in the case of piping, &c., found to be in a dangerous condition.

[*Parliamentary Agents: Messrs. Sherwood & Co.*]

(To be continued.)

PROGRESS IN ILLUMINATION.

Recent Activities of the Gas Lighting Industry.

On Tuesday, Nov. 22, Mr. D. R. Wilson presided at the opening meeting of the Illuminating Engineering Society held at the "E.L.M.A." Lighting Service Bureau, 15, Savoy Street, Strand, W.C., when recent progress in the field of illumination was discussed.

Glare Reduces Output.

The first report to be presented was by Mr. L. Gaster, Hon. Secretary of the Society, on "Progress During the Vacation." He referred to the continued advance in industrial lighting, and to the prospect that the Bill for consolidating and amending the Factory Act will provide for adequate lighting in factories. Good lighting, he said, is specially necessary in the cases of persons with subnormal vision. However, higher illuminations alone will not suffice unless other requirements, such as absence of glare and inconvenient shadows, are satisfied. Mr. Gaster cited an instance where, in a textile mill, the provision of a much higher illumination was accompanied by a diminution in output, because glare and undue shadows were introduced.

Speaking of street lighting, Mr. Gaster mentioned the annual conference of Public Lighting Engineers held at Brighton last September, and the Public Works, Roads, and Transport Congress at the Royal Agricultural Hall this month. Accounts of both these meetings have been published in the "JOURNAL." He expressed the hope that the propaganda of both the gas industry and the electricity industry will continue to conform to the principles of good lighting which the Illuminating Engineering Society is advocating, so that efforts to educate the consumer in the importance of better lighting will be made on a concordant and uniform plan. Having remarked on the development of the "B.E.S.A." and the National Illumination Committee, through co-operation, Mr. Gaster gave a brief review of the meetings and congresses abroad. The discussions throughout these meetings, he said, show how the fundamental idea underlying the Illuminating Engineering Society—the co-operation between producer and user, and the joint efforts of lighting engineers with outside experts, such as architects, medical men, inspectors of factories, &c.—is also accepted by the illuminating engineering societies in other countries.

Electric Lighting Development.

Following Mr. Gaster's remarks, consideration was given to a report by Mr. S. H. Callow on the progress in electric lighting during 1926-27. In the absence of Mr. Callow, the report was summarized by Mr. J. S. Dow. It was stated that there have been no outstanding developments in the design and manufacture of electric lamps. The inside-frosted lamp, which only absorbs 1½ to 2 p.ct. of the light emitted by the filament, and considerably reduces glare, has made steady progress; and in view of the fact that there is now little difference in price between gasfilled lamps and other types, it is anticipated that gasfilled lamps will quickly supersede all other types for general lighting purposes. During the year, lamp manufacturers have given much thought to the problem of reducing the number of patterns of lamps they make. They are aiming at a simplified range of sizes, with consequent lower costs.

With regard to shop lighting, this has advanced greatly, and has effected a marked improvement on the load factor of central stations. In important shopping districts, particularly in the West End of London, it is now general for the retailer to employ artificial lighting throughout the day, to mitigate daylight reflections from plate-glass windows. As a contrast to this progress, however, lighting practice in offices has not shown any marked advancement.

Progress in Gas Lighting.

At this stage in the proceedings, Mr. H. Talbot, who is Chairman of the Lighting Section of the Society of British Gas Industries, outlined the progress in the gas lighting industry during the same period. He commenced by saying that no public utility service emerged from the difficult period of the coal strike with a finer record of achievement than that of the gas industry generally.

Speaking of domestic lighting, Mr. Talbot remarked that during the year under review there has been development of a number of burners. A specially designed burner for a single incandescent mantle has been introduced which, by careful proportioning of the gas orifice, the Venturi tube, the superheater chamber, and the screen in this chamber or in the mantle nozzle, effects an almost complete aeration of the incoming gas prior to combustion at the burner nozzle. This produces a higher flame temperature with a more compact flame, together with complete silence in operation. Another development is the introduction of a refractory superheater with two or more nozzles depending from the chamber without any screen, gauze, or perforated refractory disc to impede the flow of the combustible gas mixture. As for the metal parts of burners, development has continued in two main directions—the employment of less easily corrodible finishes, and the use of aluminium wherever the soft nature of this metal is not an objection.

There has been a marked increase in the application of diffusing glassware. The spread of multi-nozzle superheater lighting units has led to the introduction of "diffusers," which are usually of glass, placed over, and relatively near to, the burner. There have also been introduced during the past year several attractive "economy" lighting fittings for use where

only moderate illumination is required. Mr. Talbot referred to the increasing use of the smaller mantle for domestic lighting. He remarked that two bijou mantles used on a superheater give approximately the same light as a universal mantle, and consume under ordinary conditions 25 to 40 p.ct. less gas. The results are usually stated as so many candles per cubic foot of gas used; and "it is to be regretted," observed Mr. Talbot, "that with the now universally employed therm system of charging for gaseous energy, a more scientific mode of expression—*e.g.*, B.Th.U. per candlepower-hour, mean hemispherical rating—could not be employed, as was suggested by the Chairman of the Society of British Gas Industries in an address about a year ago." [Mr. Talbot was referring to the address of Mr. F. J. Gould—see "Journal" for Nov. 17, 1926, p. 425.]

Street Lighting by Gas.

Mr. Talbot suggested that the standard specification for street lighting recently issued by the "B.E.S.A." does not take sufficient account of one vital point—the necessity for screening high-power lamps when used for street and public illumination. He warmly supported the suggestion recently put forward for more co-operation between the different authorities responsible for the lighting of London and the Greater London area.

One of the most notable developments in street lighting is the rapidly extending use of superheater lamps. Economy is thereby effected both in gas consumption and in the life of the mantles. Within a short time, mantle maintenance figures have been reduced to one-third of what they were. Another point is the astonishing progress in the use of automatic controllers—mainly of the clockwork type—for lighting and extinguishing. Mr. Talbot went on to say that many notable street lighting installations have been erected during the past year. He cited those at Penarth, Portsmouth, and Margate, and drew attention to those at Burnley and Nottingham, where superheater lamps have been carried by cast-iron brackets fixed on tramway standards. He anticipates an extension of this principle, which spells economy.

Mr. Talbot expressed regret that there are still on the streets so many of the old "square" type of street lantern body. He also called attention to the fact that the arrangement of the lamps in the streets and highways in many cases leaves much to be desired. The diversity factor, he said, is often too high, and where superheater installations have replaced the older upright burners, glare frequently results.

Shop and Factory Lighting.

With regard to shop lighting, the increasing application of superheater units to exterior and interior illumination, and the extended use of diffusing glassware are the outstanding features of the past year. The ability to arrange for the ventilation of shops, public halls, and similar buildings at the same time as the lighting installation is one of the great advantages of gas lighting over electric lighting. Speaking of factory lighting, Mr. Talbot suggested that one or other of the main organizations in the gas industry could with advantage turn its attention to this branch of the gas lighting industry for research, development, and increased business.

"Daylight" Gas Mantles.

The modern incandescent mantle, observed Mr. Talbot, gives light the composition of which approximates that of daylight from a white sky; and by suitable adjustment of the composition of the mantle, much closer coincidence between the two than is ordinarily achieved can be secured. One of the principal London gas companies has done much research in this matter, resulting in the production of standard "daylight" mantles of specified "quality," which, while not intrinsically so luminous as the ordinary mantle—the defect being from 10 to 20 p.ct.—enable relative colour values by this artificial light to be better estimated. Some of these mantles are finding application in the Yorkshire textile area; and a most interesting installation in a London art gallery was recently completed. There is, he remarked, doubtless a good field for the further employment of mantles of this type in various directions.

A Self-Lighting Mantle.

Many efforts, continued Mr. Talbot, have been made in the past to light gas burners from distant points without employing a constantly burning by-pass flame, but so far without permanent success. Catalytic methods have principally been used; and it is interesting to report that, after a great deal of experimenting and after several months' trial of the device in question, provisional patent protection has just been taken out for a catalytic system operating somewhat differently from, and apparently with better prospects of permanent success than, those hitherto utilized. It is too early yet to express any opinion on the scheme, which employs some of the most recent scientific discoveries in the applications of catalysis to chemical change; but if reasonable success is achieved, a very great step forward will have been made.

Need for Co-Operation.

Finally, Mr. Talbot put in a plea for co-operation between gas and electrical engineers. "It may be," he said, "that ultimately electricity will bulk more largely in the national economy than does gas, but that day, if it is coming, is very far distant; and in the meantime the gas engineer has nothing to lose, and the electrical engineer has much to gain, by association of effort, instead of blind and unreasoning mutual antagonism."

LECTURES TO SMOKE INSPECTORS.

The programme was reproduced on p. 273 of the "Journal" for Oct. 26 of a series of lectures and demonstrations to assist candidates in the examination to qualify them for the post of smoke inspector. The lectures extended from Nov. 4 to Dec. 5; and brief abstracts of the earlier ones have already appeared—pp. 469, 522, 624, and 692.

FURNACES.

By Dr. J. S. Owens.

In Dr. Owens' third lecture the industries in which furnaces of various types are used were considered. Under the heading of metallurgical furnaces, blast furnaces and smelters were dealt with. In the former, the quantity of solid matter in the fumes was stated to be approximately 10 grammes per cub.m., which had to be reduced to 0·01 gramme if the gas was to be used in engines. The fumes from the smelters were stated to contain usually sulphur dioxide or sulphuric acid, as well as fine dust and ore particles which it was often economical to trap by electrical means for recovery of valuable material. Steel making and re-heating furnaces were also considered; and it was impressed upon the students that, while a reducing atmosphere, implying some smoke in the furnace, was necessary, it did not follow that smoke must be emitted from the chimneys.

Reference was made to the fumes from destructors, and also from gas-works and cement works; while some time was given to a consideration of the burning of coal in a pulverized form. The lecturer stated that 40 p.ct. of the ash might be passed out of the chimney, causing serious trouble in the vicinity of the works, unless suitable precautions were taken against it. Attention was drawn to the emission of poisonous gases by motor car exhausts, and reference was made to recent accidents due to this cause.

POWER PRODUCTION.

By Dr. J. S. Owens.

The use of gas, oil, and electricity for power production was dealt with. Dr. Owens stated that coal gas was produced at an efficiency of approximately 80 p.ct., when based on the heat units in the coal. There was therefore this loss to be faced when using it to generate heat. At the same time, in many cases the convenience of coal gas was such that it was economical for furnaces for treating metals. Its main use was, however, for domestic heating and lighting, and for gas engines. It was pointed out that in the case of the latter a great economy could often be obtained by using waste-heat boilers, heated by the exhaust; but this implied some purpose being available for the steam. Lantern slides were shown illustrating different types of furnaces.

Natural gas and producer gas were next referred to; the different kinds of producers being described shortly. It was pointed out that all producer gas depended on two primary reactions—(1) the conversion of carbon to carbon monoxide, and (2) the dissociation of water and the freeing of hydrogen.

Oil fuels were considered, and their advantages over coal for use in steam boiler furnaces. It was stated that, while smoke was often produced by oil-fed furnaces, it was really unnecessary, except perhaps during the warming-up period. The use of oil in Diesel and semi-Diesel engines was alluded to; and the lecture concluded with a short reference to electricity, and the disadvantages under which this country laboured in having to produce all its electricity by burning coal.

Internal Corrosion and Dehydration of Gas.

A report presented by a Committee at the last meeting of the Pacific Coast Gas Association dealt with the question of dust and moisture control in connection with internal corrosion of gas mains. Discussing dehydration of the gas as a mitigative measure, they emphasize the following facts: The nature of deposits encountered in mains and services indicates that internal corrosion is accountable for a large proportion—roughly about 70 p.ct. Internal corrosion is an electro-chemical reaction dependent upon the presence of water vapour. Dehydration will eliminate internal corrosion, but should be justified by economic comparison of cost involved and benefits derived. In any case, the control of dust and other foreign material in the distribution system will be a problem at least for a considerable period of time; and devices should be installed to eliminate these deposits.

THE BRITISH COKING INDUSTRY.

By ROBERT RAY, B Sc., A.I C., M.I.Chem E., &c.

[Paper before the Institute of Fuel, Nov. 24—Mr. JOHN TERRACE, M.Inst.C.E. (Chief Engineer of the South Suburban Gas Company, and Vice-President of the Institution of Gas Engineers), presiding.]

The first section of the paper is mainly historical, with the object of illustrating how American and Continental nations have been developing their coking industries, while Great Britain has been practically stationary since 1914. In his suggestions as to the means to be adopted in this country for the rehabilitation of the industry, Mr. Ray lays stress on the necessity for a closer relationship between the coking industry, the gas industry, and the iron and steel trades, as all would benefit by the remedies proposed.

The author points out that for the production of a suitable blast-furnace coke at a price which would leave a profit for the producer and, at the same time, permit the ironmaster to compete on fair terms with the Continent, amalgamations of coking interests in certain areas must be brought about. This would mean the production of coke in large centralized batteries of coke ovens of a minimum capacity of 1000 tons per diem, instead of in the many small, out of-date, and unecono nical plants which are operating to-day. Figures are quoted to prove the financial advantages of such a policy.

The essential conditions attached to the successful operation of centralized coking plants, however, must be carefully noted. The first is that railway freights to-day are such as to prohibit the transport of coking slacks to a central plant. Aerial ropeways provide the solution to this difficulty; for, though the initial capital expenditure may be high, the cost per ton transported by such a system, all items included, is in most cases a fraction of the rail rates for the same distance. Again, no central battery of ovens can be a practical proposition unless the bulk of the valuable high-calorific gas produced is disposed of at a satisfactory figure, either for domestic purposes by arrangement with the local gas companies, to industrial concerns such as steelworks, or to electricity generating stations. This is common practice abroad; and it is gratifying to note that eminent gas engineers in this country are now advocating in the national interests the buying of coke oven gas by gas companies, under certain guarantees, for the purpose of cheapening this commodity to the public.

Apart from the advantages of cheaper coke and vast supplies of high-calorific gas, the modernization of the coking industry would mean the installation of plant to produce accurately graded coke. The necessity for this, if the best results are to be obtained, is recognized by all conversant with blast furnace practice; while it is of almost equal importance if the domestic smokeless fuel market is to be successfully developed. To produce such a coke—one which will stand transport and rough usage without breaking down further after grading—the study of coals and the results obtained by blending them must be given much more serious consideration. The importance of the grading of coke and the scientific blending of coals is recognized abroad; but in Great Britain the former is carried out in a most haphazard manner in most cases, while the latter is practically unknown.

The author deals in some detail with both the wet and the rapidly developing dry methods of coal cleaning, in the course of which reference is made to the great advantages obtainable by the removal of fine dust from the coking slacks, and its utilization in pulverized fuel boilers.

Discussion.

Sir ARTHUR DUCKHAM, K.C.B. (Chairman of the Woodall-Duckham Companies), expressed the conviction that they were going to have an ever-increasing competition from abroad in their coke market. The development in America had been phenomenal, though he was of opinion that it was slowing down; but competition from Belgium, France, Holland, Luxembourg, and Germany was increasing. Modern ovens were being installed, possibly with increased output capacity; and this country must be prepared for very stiff competition from those modern plants. The three propositions put forward by Mr. Ray were some of the best ways of helping the colliery industry to-day. The author had clearly defined the limits of centralization; and it was necessary to define limits, because too much centralization might result in very inefficient working. Sir Arthur believed all would agree as to the necessity for cleaning coal. Blending was one of the most important things. During the coal strike he had been told over and over again that the foreign coke had the great advantage that it was even in quality throughout. It was not that the ash content was so very much lower than that of the English coke, but that it was evenly distributed. The way to obtain this uniformity was to blend. Mr. Ray had shown that inferior coals were more readily taken care of in the modern oven than in the earlier ovens; and many collieries which had not been able to coke their slacks previously would be able to do so in the future. The dry process of coal cleaning was making progress, and if it were successful—it certainly looked like being successful—it would be of great benefit to the coal industry. After a passing reference to the benefits accuring to a colliery or group of collieries by having their coke ovens attached to them, Sir Arthur expressed sympathy with Mr. Ray's views in regard to the distribution of gas from coke ovens. Coke oven managers in the past had not understood the difficulties of gas undertakings, with their statutory obligations; and gas engineers and managers had not realized the possibilities of coke oven gas. They had been frightened, and a good many had suffered in bad times. It was purely a matter, however, of their getting together and arranging standards; and certainly when one studied the great areas where collieries and coking plants were prevalent, and where there were also large industrial plants, it seemed that the coke oven gas was the most economical gas to supply, through the gas undertakings as distributors.

Mr. G. A. HEBDEN (President, Coke Oven Managers' Association) said that he himself would have had the pleasure of contributing the paper on this subject but for the fact that he had been ill when the evidence placed before the National Fuel and Power Committee was being prepared. He had served on the Committee which had drawn up the evidence, but owing to his illness he had asked Mr. Ray to take his place, and Mr. Ray had done it throughout very successfully. Therefore, he was more or less in agreement with all that Mr. Ray had written in his paper, particularly as he was interested in a Company which had already adopted a centralization scheme, and was working a plant dealing with 37,000 tons per month, as compared with 10,000 tons per month previously. There was no doubt that centralization of any industry bristled with difficult problems, but they in this country had the men, both scientific and technical, who could overcome these difficulties. Also, he was certain they had industrialists in this country who would follow the lead of such men. The importance of the questions of the storing of coal in bulk, the cleaning of coal, both fines and large, and blending was well known to the man in the street. The practical carying-out of these problems now remained. The coke oven managers hoped, as he was sure everyone else hoped, that in the near future the work would be started.

Need for Modern Ovens.

Mr. JOHN ROBERTS remarked that one was never at a loss when asked what the coke production of this country had been in any year since about 1912, because it had remained practically constant since then; the amount of coal carbonized in any year being about 18 million tons, whereas in America the throughput had increased from about 13 million to 40 million tons. A point which had not been sufficiently emphasized in this country was that with a rapidly-heated oven they were able to utilize a wider range of coals than they could with a slow oven. Why there should be so much hesitation about the installation of modern ovens, he could not understand. He could readily appreciate it in the case of low-temperature plant, because he thought no company could produce a balance-sheet, covering a period of five years, which would induce them to invest money in it. But the balance-sheets of companies owning modern coke oven plant reflected the performances of those plants; and, what was more, by using such plants and by paying suitable attention to blending, they could produce fuel under high-temperature conditions which the low-temperature people were unable to manufacture.

Blending and Domestic Coke.

Dr. E. W. SMITH observed that no doubt a great deal needed to be done to convince the gas industry that every coke oven scheme would give the guarantees, and, having given them, would be able to maintain them, which was absolutely essential to the gas industry. However, it was pleasing to note that contracts had latterly been made with gas undertakings which had in them certainty of the maintenance of supplies. Another point of vital interest to both the gas industry and the coke oven industry was that of the production of domestic coke. He adhered very strongly to the view expressed by Mr. Roberts, that it was possible at high temperatures, with proper blending, and in narrow ovens—anything from 12-in. to 16-in. —to produce an ideal domestic coke, equal to anything that had ever been produced at low temperatures; but in order to do this they had to get everyone to believe that the cleaning of coal was necessary, as well as the drying of coal or its maintenance in the dry state. Also, the gas industry and the coke oven industry must get together and agree, first, upon a proper scheme for the education of consumers, and, secondly, upon a combined selling scheme. It was well known that in the gas industry there were frequently large stocks of so-called domestic coke available for sale. While they had those large stocks intermittently, it was natural that the gas industry did not welcome the entry of coke oven concerns into the open market with domestic coke. It had to be considered, however, that while the amount of coal used domestically was about 40 million tons per annum, the total amount of coke available from the gas industry was only about 6 million or 7 million tons, and not more than (say) 12 million or 13 million tons was available from the coke oven industry. If all that coke were available for domestic purposes, it would not supply more than 50 p.ct. of the total requirements of domestic solid fuel. This indicated that there was something wrong somewhere with regard to the education of the consumers. He was entirely satisfied, from a thorough knowledge of what could be done domestically with a proper coke—not a coke such as at present on sale in many places—that there would be no difficulty, if the two industries worked together properly, in getting rid of such a quantity of coke that even the gas undertakings would on occasions—say, in the spring and the autumn—be prepared to use gas for heating the settings, because they had had to sell the coke. He was sure that this state of affairs could exist if the industries were sufficiently organized. In certain large cities in the country, at some parts of the year the gas undertakings had

no coke available, and were harassed to fulfil contracts for domestic purposes, whereas at other times, when there was not such a demand for coke, they were actually sending their surplus into other large areas, and selling it in competition, after paying railway rates, at 6s. or 7s. per ton more than they could get locally for domestic coke. In his view the question of organization was of more importance in these matters than that of technique.

TOWN GAS IN INDUSTRY.

Mr. H. C. ARMSTRONG, speaking of coke oven gas for town supply, remarked that a year or two ago he had been thinking of installing some town gas fired furnaces to replace some other inefficient furnaces, and he had found that with town gas he could get five times the efficiency he had obtained with coal for the same expenditure. He considered that 3d. per therm was the economic price at which town gas could compete with raw coal. He appreciated, of course, that gas was used very largely in many small furnaces, and that certain conditions permitted of a higher price being paid for the gas; but in order to use gas as a real competitor with raw coal, its price should be about 3d. per therm. It was supplied at this rate in Sheffield; but he believed that Sheffield was the only city in the country who did this. Referring to the dry cleaning of coal, he said that this was not successful in every case.

Mr. R. A. MOTT (Research Chemist, Department of Fuel Technology, Sheffield University) suggested that, in regard to blending, the Continental concerns got more credit than they usually deserved. In Germany, Belgium, France, and Holland there were large quantities of lean coal, with a volatile content of less than 15 p.ct., so that it was non-coking, and formed an excellent material for blending with the higher volatile coals. On the other hand, they in this country had no such low-volatile coal. He and his collaborators had carried out experiments with anthracite duff, but it was a very expensive material. They were concerned, too, with the use of non-coking coals. A number of Coke Research Committees had been at work on the problem, and in Yorkshire they had been trying to blend the non-coking coals from the Doncaster area with the normal coking coals of South Nottinghamshire and Derbyshire. In some cases they had been able to add large quantities of non-coking coal without reducing materially the physical strength of the coke. Indeed, in one case, with Derbyshire coal, they were able to improve the strength.

Mr. C. P. FINN, discussing the distribution of coke oven gas, said this was being done in Yorkshire on a fairly large scale, but it was open to extension. Those in the gas industry, when they became fully alive to the possibilities, would take more coke oven gas, and they would be prepared, as they should be prepared, to sell gas to industry at a much lower price than that at which they could sell it at present. There was, of course, no reason why there should not be an extension of the practice of distributing coke oven gas direct to works. One coke oven manager was already supplying gas to industrial works from the main which also supplied gas to the gas-works. Also, there was no reason why coke oven concerns should not link together, and use common mains, as was done in Germany—at least in industrial areas.

CHEAPER ELECTRICITY.

By Sir PHILIP DAWSON, M.P.

[Paper before the Institute of Fuel, Nov. 23.—Sir ALFRED MOND, Bart., M.P., presiding.]

In Germany 70 p.ct., in the U.S.A. 65 p.ct., and in Belgium 56 p.ct. of the total motive power required for manufacturing purposes is electric; the corresponding figure in Great Britain being only 40 p.ct. In 1924, only 14 p.ct. of the coal mined in England was cut mechanically, against 47 p.ct. in Scotland. As compared with the mines in the Pas de Calais, our mines are only electrified to the extent of 43 p.ct.

In Germany, something like 40 p.ct. of the electricity is produced by means of brown coal. In this country large reserves of coal remain unworked because of their high ash contents, and they could easily be worked with the rest of the seam and sold at a cost of from 4s. to 5s. a ton at the pit mouth. If this were done it would facilitate the mining of the seam as a whole. This fuel has a calorific value about double that of the brown coal so successfully used for producing electricity in Germany, but so far little or no attempt has been made to utilize it in this country. By not doing so, a large portion of our coal resources are lost beyond recovery. In the future these poor qualities of coal must be used in the form of pulverized fuel to produce electricity at the colliery. In addition, more serious attention should be given (where the coal is suitable) to low-temperature carbonization.

The pall of smoke which hangs over Middlesbrough, and the like of which is not to be found over Essen, testifies to imperfect combustion and to a waste of gas. A large portion of coke oven gas, owing to insufficient co-operation between coal mining and steel production, and the difficulties of utilizing it elsewhere, is still being wasted by burning in the open air; and steps must be taken to preserve this source of energy.

The co-ordination and linking up into a community of interests of the majority, or better still of all the collieries in any one district, would enable the creation of large electric generating stations, and eventually of large bye-product plants, both of which, for economic reasons, would have to be closely affiliated with the colliery interests. Similarly, excess gas produced in steel works should be utilized for generating electricity supplied into the general transmission network controlled by the Central Electricity Board.

The progress that has been made in lowering the cost of production is shown by the fact that, while not so long ago the average coal consumed, based on a calorific value of 11,000 B.Th.U., per unit generated, was over 5 lbs., this figure in 1925 had sunk to 2·55 lbs., while the most efficient station to-day produces the unit for under 1·5 lbs. of coal. A further reduction, perhaps to as low as 1·2 lbs. of coal per unit generated may be reached at no distant date. An efficiency of electricity generation of 30 p.ct. is within sight, and there is no reason why, under favourable conditions, 40 p.ct. should not be reached in the near future. When we reflect that 40 p.ct. of the total generating costs in a modern station to-day is due to capital charges, and 40 p.ct. is represented by the cost of fuel, we see the importance of reducing these two items.

Stations operating on their own account must include spare plant, which does not represent a percentage of the maximum demand per KW., but of the number of units of plant installed. Thus, with a maximum load of 50,000 KW., four units of 25,000 KW. would probably be installed, two of which would be spares—one to take the place of a machine which was being overhauled, and the other to be put into service in the case of a breakdown. Thus, in Great Britain, the capacity of plant installed in our public utilities in 1925-26 was 62 p.ct. in excess of the combined maximum demand. It will be obvious that if a number of large stations are linked up, and these supply into one transmitting system (grid), spare plant in any one station is available for all, so that the amount of spare plant in this case could easily be reduced to 10 p.ct., and even less.

The Central Electricity Board is entirely independent of any political influence; and if any undertaking thinks its interests have been unfavourably affected, it can appeal to an independent arbitration tribunal which has been created for this purpose.

Discussion.

Sir ARTHUR DUCKHAM, K.C.B., remarked that collieries to-day were anxious to find means of increasing revenue; and one of the ways in which a colliery could increase its revenue was by getting rid of its poorer fuel. Collieries to-day had trouble in getting rid of their better-class fuel, and they were unable to dispose of some of the very poor fuels. If the poorer fuel could be used for the generation of electricity as efficiently as the better-class fuel could be—and this was possible—the poorer fuel would become a source of revenue to the collieries. To-day poorer fuel was loaded into railway trucks and transported to various works; and the cost of transportation was greater than the value of the fuel. Reference had been made to the cleaning of fuel. If one could take out of the fuel at the collieries the dirty smalls or dirty fines, which had a thermal value of (say) 9000 or 9500 B.Th.U., the value of those smalls might possibly be 1s. or 2s. per ton at the collieries.

Sir WILLIAM LARKE, K.B.E. (Chairman of Council of the Institute, and Director of the National Federation of Iron and Steel Manufacturers), said he found, when pressing for the application of electrical power to industry, that frequently it was not sufficient merely to put forward the claim of increased efficiency, when the cost of the power in relation to the cost of the product was of the order of only 2 p.ct. In the case of the textile industry, with the even and unvarying turning moment which one secured by the application of electrical power, they were able to run their productive machinery at a higher average rate in relation to the product they were producing than was possible with a mechanical drive transmitted by ropes or belts, because the variation which followed the slip in belts, and to some extent in ropes, was such that they must always run their productive machinery at a margin below the maximum speed which the product being produced would permit.

Sir RICHARD REDMAYNE, K.C.B., said this country was an eminently suitable one for the generation and distribution of electrical energy—more so than any other country in the world. He agreed absolutely with Sir Philip Dawson as to the advantages which would accrue from the wider application of electrical energy by collieries. The Kent coal was the most friable coal in Great Britain, and was peculiarly suitable for use in a pulverized form for the generation of power. Whereas the cost of pulverizing high-class steam coal from South Wales would be about 2s. 6d. per ton, the cost of pulverizing the Kent coal would be about 9d. In view also of the fact that the Kent coalfield was alongside the sea, and that there was an immense quantity of water available for condensing purposes, he could not help wondering why Kent had not been selected as providing a site for one of the large power stations to be built. Surely it was cheaper to transmit electricity by cable than to transport coal to London for use as a fuel for generating. As to the use of pulverized fuel at sea, the only trouble was to get over the diffi-

culty of spontaneous combustion of the fuel. If the volatile constituents were reduced by low-temperature carbonization, and from 6 to 7 p.ct. left, that fuel would not be subject to spontaneous combustion.

Mr. W. M. SELVEY said that, as one who had been intimately connected with the coal industry for many years—particularly in relation to power—he felt great sympathy with that industry at the present time. Not many practical suggestions had yet been made to help the coal trade out of its trouble. The principal difficulty was one of finance. It was not quite true to say that the coal trade had done nothing; it had done a great deal, and was still doing a great deal, in spite of the position in which it found itself. Surely it was a serious matter, if collieries could not get rid of 14,500 B.Th.U. coal, to suggest that they could afford to spend capital in order to tackle the poorer fuels, which, after all, did not represent, as a rule, a very large proportion of the output of the larger modern collieries.

Mr. ROGER SMITH said he did not wish to be understood as belittling the advantages of the grid; but as this was emphatically a coal country, the differences in cost between quite small stations and the large stations now projected was nothing like so great as some people imagined. They could not expect, as the result of the scheme of the Central Electricity Board, to get such reductions in prices and costs as had been suggested. They must concentrate upon a much better selling organization, and a greater reduction in the cost of distribution.

Sir PHILIP DAWSON said that, in the matter of selling, the electrical industry did not, perhaps, sufficiently appreciate what could be done. The gas industry understood it thoroughly well; and he congratulated it upon its initiative. The electrical industry, if it copied the gas industry a little more, would probably be more successful. A very good example of the way in which the gas industry dealt with this aspect of the business was to be seen at the British Empire Exhibition at Wembley.

CONVERSION OF COAL INTO OIL BY THE BERGIUS METHOD.

By J. IVON GRAHAM and D. G. SKINNER, of the Mining Research Laboratory, Birmingham University. (Financed by the British Colliery Owners' Research Association.)

[Paper before the Institute of Fuel, Nov. 24—Major F. A. FREETH, F.R.S. (Chief Chemist to Imperial Chemical Industries, Ltd.), presiding.]

The consumption of petrol and of fuel oil has enormously increased during the last few years; and for a country like Great Britain, which possesses no natural oil supplies, the possibility of their production from coal at a reasonable cost has become a matter of great national importance. By the Bergius process, at the present rate of consumption, the liquid fuel needs of this country could be met by the treatment of approximately 15 million tons of raw coal per annum—*i.e.*, about 6 p.ct. of the total amount raised. Obviously, therefore, hydrogenation cannot be a panacea for the ills of the mining industry, even should the process be economically feasible.

The Bergius process consists essentially in subjecting coal to heat-treatment in a hydrogen-containing atmosphere at high pressure. The best results would seem to be obtained by subjecting the coal to treatment at temperatures between 400° and 450° C., and a pressure of over 100 atmospheres, in the presence of a distribution medium. Oil produced by a previous hydrogenation is used by Bergius for this purpose. For the liquefaction of coal to be a commercial proposition, continuous working is essential; and Dr. Bergius and his collaborators deserve the highest praise for the way in which they have overcome the many engineering difficulties involved in working on a large scale at pressures in the neighbourhood of 200 atmospheres.

Since 1922, investigation of the process as applied to British coals has proceeded without break in the Mining Research Laboratory at the University of Birmingham. These experiments, since 1924, have been financed by the British Colliery Owners' Research Association, and have, in the main, confirmed Bergius's results. Tabulated results of the hydrogenation of about thirty British coals have shown clearly that, under the same working conditions, some coals are much more amenable than others to the action of hydrogen under high pressure. The aim of these experiments has been, and is, to ascertain with more exactitude than appears to have been the case with those carried out by the Bergin Aktien-Gesellschaft, which type of coal and which constituent of the coal substance undergo hydrogenation most readily. It is believed that further research on these lines will afford useful evidence regarding the course of the hydrogenation reaction.

The solid residue left after hydrogenation amounts, on the average, to about 20 p.ct. of the original cost. The commercial utilization of this product seems difficult, except in the form of powdered fuel or in low-grade producer gas practice. Petrol may be obtained in amount up to 25 gallons per ton of coal treated. The value of the heavier oil is not, however, so assured, although Bergius claims that good lubricating oils have now been obtained from this portion of the products.

It would appear that the value of the products will mainly depend upon the prevailing price of petrol and of fuel oil. It is certain, however, that the prime necessity for the commercial success of the process is cheap hydrogen. Bergius, of course, realizes this fact, and has consequently developed a new process in which the gaseous products are utilized to this end.

It appears, from the researches carried out in the Mining Research Laboratory, that those coals falling into the bituminous division of the Seyler classification, and having a carbon-hydrogen ratio between 15·5 and 16·5, give the highest oil yields. With coals of this class, the process might possibly be worked with profit at the present time. There seems no doubt, however, that it is only by further research into the influence of constitution of coal upon ease of hydrogenation, and the nature of the products obtained, as well as in the engineering technique of high-pressure work, that the more general application of the process can be made a commercial success.

Discussion.

Dr. C. H. LANDER (Director of Fuel Research), who opened the discussion, said there were one or two points with regard to the paper to which he would like to refer. The work the authors had done was necessarily on a small scale; and it was difficult to correlate these experiments with the work that had been done in Germany and in this country elsewhere. It had been found that coals which behaved perfectly in a small bomb would not work in a large bomb, and *vice versa*. Of course, there was an intrinsic difference in the conditions. He wished to emphasize the point that certain coals were more amenable to hydrogen than others. Sometimes there was a good deal of confusion when people said that certain coals could not be hydrogenated, and when, in fact, what was meant was that they could not be fully hydrogenated. This fact opened up a vista of which nobody could see the end. The kind of thing that one could do with coal by hydrogenating it under pressure, while a long way from being commercial, was perfectly astounding. He himself had shown that it is possible to take an absolutely non-coking coal, and by introducing only ½ p.ct. of hydrogen it could be made into a coal more highly fusible than anything in existence. It was possible to take an anthracite coal, and make a hard metallurgical coke. It would cost £200 a ton to do it; but the fact was that it could be done. One never knew where these things would lead in the future; and it was in this connection that small-scale work was so valuable. With present knowledge, it was possible to make a plant on the Bergius process which would work continuously with a minimum of trouble. At the same time, it could not be done in competition with natural oil at the moment.

Dr. W. R. ORMANDY, referring to the difficulty of correlating small-scale experiments, said he really thought the Birmingham University would be well advised to appreciate that the results of their working were in no way applicable to the commercial aspect and commercial development. It had been definitely proved that a very complete conversion could be obtained when using coal tar as the medium for mixing with the coal. The statement was made in the paper that 50 p.ct. of the coal was converted. Coals, however, had been dealt with in the larger plant of which 92 to 93 p.ct. of the coal substance had been converted into materials which were soluble in benzole, and Bergius classified as oil everything that was extracted by benzole.

Dr. A. R. BOWEN said the statement made by the authors that 6 p.ct. of the coal at present produced in this country would provide all our oil needs was interesting. A similar figure had been calculated in Germany, and was put at 2½ p.ct. The fact that the Bergius process was considered by the inventor to be non-catalytic appeared to be true; yet the pronounced action of catalysts in such reactions might render the process obsolete as it stood. In some German papers it was claimed to be able to control the nature of the oil formed by the action of catalysts. The Bergius process depended entirely on the nature of the coal used; and it seemed that the use of catalysts opened-up an entirely new development.

Dr. H. G. SHATWELL remarked that it seemed to him the conditions which affected the Berginization of coal were very numerous. Not only was there the actual coal itself, with its variations, but there were also the many variables relating to experimental conditions. He had worked out a few figures which seemed to suggest that the nitrogen content had a good deal to do with the oil yields obtained. The carbon content of the coal appeared to have nothing to do with it. He submitted to the authors that it was possible that the nitrogen in the coal was acting as a catalyst, and that if ammonia or ammonium salts were added some useful results might be obtained. It had always seemed to him that the Bergius plant as designed and erected in Germany was more complicated than it need be.

Dr. P. DVORKOVITZ said that hitherto very little support had been given in this country to the question of producing oil from coal; but there were plenty of workers capable of making such investiga-

tions, without entering into the problems of high temperature and the cost of it. It was known that it required 35,000 c.ft. of water gas to liquefy a ton of coal; but such processes from the commercial point of view were absolutely useless, although from the point of view of laboratory experiments they might be interesting.

Mr. A. WORSLEY said it was necessary, however, to know something much more than this. One wanted to know whether certain classes of coal which were known to be economically practicable were to be found in specific areas in sufficient quantity to justify a continuous operation plant. This was a point in economics which was worth while keeping in view.

Dr. A. E. DUNSTAN hoped the authors would give some idea of the commercial value of the so-called oil obtained by this process, because in his opinion it was an exceedingly inferior oil.

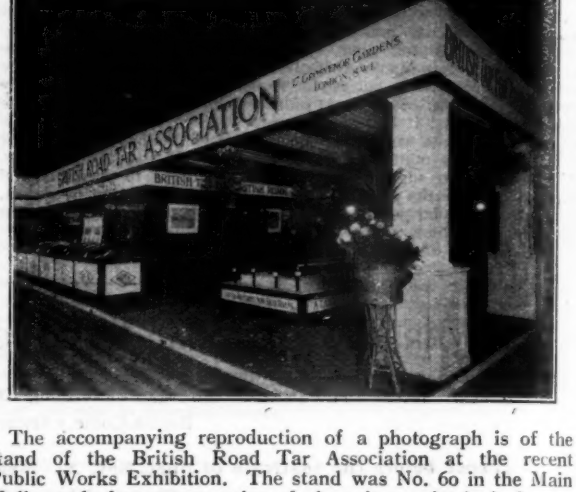
Dr. STRONG asked the authors if they knew anything of the use of gases other than hydrogen for this process. Vaterman, at Delft, had carried out work using hydrogen, CO, and steam, and also producer gas; and in these reactions he had obtained similar results, using these very different agents. Further, the same investigator had used nitrogen in this work; but on scraping out the autoclave he got sundry local explosions, and so decided to leave the matter to some other experimenter. There was, however, a remarkable similarity in the general results.

Dr. DUNSTAN said he had worked with nitrogen in the manner suggested by the last speaker, and had obtained precisely the same results as when working with hydrogen, although the final material was very much less saturated than that obtained by Bergius.

Mr. SKINNER said it had been his custom for a long time to do experiments in nitrogen, to compare with the results obtained with hydrogenation; and he always had a very much lower yield of oil —much lower, in fact, than that obtained by ordinary distillation at the same temperature.

Mr. GRAHAM, replying to the discussion, said the difference between large-scale and small-scale work was fully appreciated. As to the remarks about the relation of nitrogen to oil yield, the authors had considered this, but came to the conclusion that the results of such an investigation would not warrant carrying it out. The work Bergius had done was extremely valuable; and the evolution of his high-pressure apparatus would confer a lasting benefit on the world generally. Dr. Dunstan had asked what the authors considered the commercial value of the oil obtained by this process. As far as they could see, the light fractions would be quite useful as a petrol; but as regards the heavier fractions, he was afraid they were still in the dark.

A BRITISH ROAD TAR ASSOCIATION EXHIBIT.



The accompanying reproduction of a photograph is of the stand of the British Road Tar Association at the recent Public Works Exhibition. The stand was No. 60 in the Main Hall; and, from every point of view, it can be looked upon as the most successful exhibit the Association has ever had. In addition to attracting representatives of highway authorities, engineers, and surveyors from all parts of the country, the stand was visited by many foreign delegates, who evinced great interest in the progress being made by road tar. Perhaps the most unique feature of the exhibit was the tar viscosity demonstration apparatus, which showed in a clear and easily grasped manner the properties of tar for various uses in road making. The offices of the Association are at 17, Grosvenor Gardens, S.W. 1.

CITY AND GUILDS OF LONDON INSTITUTE.

Report on the Work of the Session 1926-27.

An increase of 195 candidates in gas subjects—chiefly in gas-fitting—is recorded in the report for the session 1926-27 on the work of the Department of Technology of the City and Guilds of London Institute (published by John Murray, Albemarle Street, London, W., price 1s. net). It may be pointed out that in the previous year these subjects showed a falling-off of 224, consequent upon the introduction of the new syllabuses in Gas-Works Practice, Gas Supply Practice, and Gasfitting. Taking the whole range of technological examinations, the percentage of candidates successful in passing was 62·4, as compared with 61·8 in 1926. The total number of candidates examined in all subjects at home and abroad in the session 1926-27 was 14,205, as against 13,985 in the preceding year.

The Committee which was formed, as recorded in the last report, to consider a proposed co-ordinating and standardizing authority for technical examinations, and upon which the Institute were represented by the Superintendent of the Department, after its first meeting invited the Association of Technical Institutions, the Association of Principals of Technical Institutions, the Association of Teachers in Technical Institutions, and other educational bodies, to be represented upon it. Eventually it was joined by representatives of these bodies, upon the understanding that the questions under consideration should be approached *ab initio*, and that participation of the additional representatives in subsequent meetings of the Committee did not involve the acceptance of any previous findings provisionally adopted by the Committee. At a full meeting of the Committee held subsequently, it was unanimously decided to ask the Board of Education to receive a deputation with a view to the appointment of a Committee to explore the whole position. As the outcome, a Departmental Committee has been appointed by the President of the Board of Education, under the Chairmanship of the Hon. E. Cadogan, C.B., M.P., with the following terms of reference:

> To inquire and report as to the arrangements for the examination of students attending part-time schools (excluding art schools) under the Regulations for Further Education, with particular reference to the place and value of examinations as an element in training for industrial, commercial, and professional activity.

Questionnaires have been issued—among the recipients being the City and Guilds of London Institute. Among other points raised in the Institute's answers, the desirability that the Institute should be permitted to hold in England and Wales in a wider range of subjects than at present an intermediate examination to precede by one or two years the present final grade of examination has been re-stated. In some of the reports by the Examiners on the last examinations, attention is again directed to the fact that candidates are now in many instances presented for the Institute's final examinations without sufficient preparation in the elementary groundwork which should precede the more specialized work of the final grade. Thus the Examiner in Coke and Bye-Products Manufacture reports: "It is probable that the training of efficient operators on coke oven plants is to a large extent rendered difficult by the absence of an examination equivalent to the former Grade I., as men are chary about taking a two or three years' course before examination." Next year an examination preceding the final examination will be held in a wider range of subjects.

The Institute renew their thanks to those organizations who support the cause of technical education by the offer of prizes. These bodies include the Society of British Gas Industries, the Coke Oven Managers' Association, and the Institution of Heating and Ventilating Engineers.

It is shown by the tables of results of the examinations last year that the total number of candidates who offered themselves in the Minor Course in Gas-Works Practice was 34, in the Minor Course in Gas Supply Practice 41, and in the three grades in Gasfitting 255. The percentages of failures were: Gas-Works Practice, 29·4; Gas Supply Practice, 48·8; Gas-fitting, Grade I., 48·8; Grade II., 67·8; and Final, 42·8.

NEW PROGRAMME.

The regulations and syllabuses for gas subjects have been revised. It was stated in the last report that the syllabuses which had been adopted by the Institute upon the recommendation of the Institution of Gas Engineers had met with some criticism; and as a result of further discussion, the detailed syllabuses in science ancillary to the main technical subjects have been simplified.

All inquiries relating to the work of the Department should be addressed to the Superintendent, Department of Technology, City and Guilds of London Institute, 29, Roland Gardens, London, S.W. 7. It may be added that it is intended to issue the Department's programme at an earlier date than usual next year.

Transactions of the Australian Gas Institute.—We have received from Mr. James Harrison, the General Secretary of the Australian Gas Institute, a copy of the Transactions of the Institute for 1926. This comprises a report of the first annual convention, which was held on Nov. 16, 17, and 18, 1926, under the presidency of Mr. P. C. Holmes Hunt, M.Inst.C.E., F.I.C.

WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.

Members of the Association met at Porth on Saturday, Dec. 3, and were accompanied by Councillor T. Owen, Chairman of the Rhondda Urban District Council; Councillor W. S. Lane, Chairman of the Gas, Water, and Electricity Committee; and Mr. Octavius Thomas, Gas and Water Engineer and Manager, Pentre. Councillor Owen welcomed the visitors on behalf of the Rhondda Urban District Council. The party then proceeded to the Rhondda Valleys Miners' Rescue Station at Dinas, where they were received by Mr. J. H. Thorne, Superintendent of the Station. Demonstrations were given by Mr. Thorne, assisted by members of his staff, of how the various kinds of apparatus were used in the work of rescue in colliery disasters. These were followed by a complete inspection of the Station, and the methods adopted for practising, drilling, and preparing for rescue work.

At the termination of a most interesting visit, the members and visitors returned to Porth, where they were entertained at tea by Mr. Octavius Thomas.

CO-PARTNERSHIP.

By T. NOALL, of Cardiff.

[EXTRACT.]

The principles of co-partnership are not cut and dried, but are elastic, and they have been applied to a number of businesses under varying conditions. The important feature in co-partnership is that it gives to employees a share of the profits of the business, and encourages them to accumulate that distribution of profits in the form of capital. Merely to share surplus profits year by year does not necessarily produce permanent benefit to the worker. But where the worker's division of the profits, or part of it, is saved for him and invested in the business, then some provision is accumulated for times of adversity or old age, and, in addition, the worker is instinctively led to take a deeper interest in, and devote greater effort to, the business. Consequently the worker year by year becomes better fitted to undertake duties and responsibilities of increasing importance, and by acquiring a larger share of personal wealth educates himself to the desirability of working together with his employer for mutual gain and improvement. Co-partnership—modified, and not fully applied in some cases—is in operation, with great success, in many industrial enterprises in both this and other countries.

In the South Metropolitan Company, practically all the employees, whether permanent or winter workers, are co-partners. This means that they have signed agreements with the Company under which they have undertaken to work for the Company for six or twelve months, as the case may be; and on the other hand the Company have guaranteed them employment for the same period. The agreement does not prevent a worker from leaving the employment of the Company for any ordinary reason, as, for instance, for the purpose of taking up better paid work elsewhere. The co-partners appoint three Directors out of the ten comprising the Company's Board of Directors. There is an elected Co-Partnership Committee, which looks after the men's interest, deals with social matters, inquires into accidents, and takes care of the provident fund. During the war it also had charge of the pensions and allowances to the dependents of men who joined H.M. Forces.

In 1920 statutory provision for co-partnership was for the first time incorporated in an Act of Parliament. It is arranged that when, through good work, gas can be sold below the basic price, the amount thus saved is to be calculated; three-quarters of the surplus going to the consumers in reduced price of gas, and the remaining quarter being applied in two equal parts for the benefit of the shareholders and the employee co-partners of the Company. At Dec. 31, 1925, the Company had 8050 employee co-partners holding £680,893 of shares and deposits in the Company.

The Gas Light and Coke Company, which started a co-partnership scheme in 1909, has nearly 13,000 co-partners, holding £533,700 of stock. The Cardiff Gas Light and Coke Company has 585 co-partners holding £18,884 of stock. By the end of 1903, five Gas Companies had adopted co-partnership schemes, having 6500 co-partners, holding £222,420 shares and deposits. By the end of 1925, 41 gas companies had co-partnership schemes, with 37,172 co-partners, holding £1,944,819 shares and deposits. And let me say at this juncture that there is no industrial organization in existence that can surpass the great gas companies for efficiency of service.

CO-PARTNERSHIP AT CARDIFF.

Now, I must supply you with a few details of the scheme adopted by the Cardiff Gas Light and Coke Company, which I have the honour to serve. The Cardiff Company first adopted the principle of co-partnership in 1909. The scheme, similar to the late scheme of the South Metropolitan Company, provided for payment to co-partners, out of the profits of the Company, of a percentage bonus on salaries or wages; the amount of profits so distributed being variable according to the price at which gas was sold. The basis of the bonus scale was the Company's maximum price for gas of 3s. per 1000 c.ft. For every fall of one penny in the price of gas below the 3s., a dividend of ¾ p.ct. on wages could be paid to co-partners.

The scheme from its inception worked admirably, and by 1914 the price of gas had been reduced to 2s. 5d. per 1000 c.ft., with a bonus on earnings to co-partner employees of 5½ p.ct. Then came the war; and the consequent heavy advances in price of raw materials and labour increased the cost of gas to beyond the 3s. per 1000 c.ft., so that the bonus automatically disappeared. It is wrong, however, to say, as has been said even by some leaders in our own industry, that co-partnership was suspended during the war. As a matter of fact, the co-partnership spirit was never better exemplified, nor were the results of co-partnership at work ever needed in a greater degree or more fully realized than in those fateful days of warfare, when the gas industry was struggling to keep things going. Incidentally, the late Lord Moulton said that the war would never have been waged to a successful conclusion but for the gas industry. We may add that the gas industry would never have been able to carry on but for the co-partnership spirit.

The Cardiff Gas Act, 1921, conferred upon the Company authority identical with that enjoyed by the South Metropolitan Company by virtue of its Act of 1920, whereby a basic price for gas was fixed, and when gas can be sold below that figure the surplus has to be distributed three-quarters to the consumers (in reduced price of gas) and one-eighth each to the shareholders and co-partners.

A co-partner has to be 21 years of age, must have been in the service of the Company for at least twelve months, be a good worker, and sign a working agreement. The bonus distribution is calculated on the total ordinary remuneration of the co-partner; no account being taken of overtime or additional payments. No deduction is made in respect of absence through sickness, unless the total period of sickness exceeds eight weeks, when only the excess period is deducted. On the declaration of the bonus, the amount due to each co-partner is placed to his credit—one-half in the cash account and one-half in the trust account.

Bonus placed in the cash account shall remain there to accumulate at interest (unless it is transferred to the trust account by the co-partner's direction), but for good reasons it may be withdrawn by the co-partner upon his giving seven days' notice.

Bonus credited to the trust account, together with interest or other sums added thereto, is invested in the Company's ordinary stock in the names of the trustees of the co-partnership fund. When the amount has accumulated sufficiently for the issue of £10 or more stock, the trustees transfer such amount to the co-partner concerned.

In the event of a co-partner leaving the Company's service, or of the superannuation or death of a co-partner, the trustees of the fund pay or transfer to him or his representative whatever money or stock may be standing to his credit under the scheme.

Interest is credited on all bonus and savings at the rate of 5 p.ct. per annum. The trustees of the fund utilize the funds available for the purchase of the Company's ordinary stock at the current price in the open market, and transfer the stock to co-partners at the net average price at which purchases have been made.

Stock purchased for co-partners with co-partnership bonus shall not be sold by a co-partner while he remains in the Company's service, without consent. All certificates for stock purchased through the fund shall remain in the custody of the trustees while the employee continues in the service of the Company. Upon ceasing to be an employee of the Company, the stockholder shall be entitled to receive his certificates, and be at liberty to sell or retain his stock according to his desire.

The Committee of Management of the fund consists of twelve members, six of whom are elected or nominated by the Directors, and six by the employee co-partners.

The Cardiff Gas Company has an Athletic and Social Club, with 650 members, a recreation ground with pavilion and equipment, benevolent and other funds, and a magazine issued quarterly.

CO-PARTNERSHIP AND TRADE UNIONS.

Trade unionists as a whole have not devoted to co-partnership the serious attention it deserves, and their reply to its advocates may largely be summed up in the question: Why not absorb any additional profit there may be by an increase in wages? The answer to this is obvious. Wage rates have to be fixed before the product is realized, which means that a margin will be left to meet various contingencies. This margin can be utilized wisely and with good effect by co-partnership. Representatives of each side would be freer to make settlements if there were an assurance of an automatic allocation of a portion of

the profit fund at the end of each half-year or year, as the case might be.

The worker wants three things—a better reward for his labour, more security for continuous and permanent employment, and a more independent position. Co-partnership gives him these in a higher measure than any other proposed method of reforming the industrial system. It gives a share of profit in addition to wages, by promoting harmony and profitable working it tends to produce regular and permanent employment, and it gives the worker the rights and status of a shareholder. Then, too, workshop committees naturally grow out of it for dealing with questions which would otherwise have to be decided autocratically.

After a vote of thanks was accorded Mr. Noall, on the proposition of Mr. W. E. CROWLEY (Newport), seconded by Mr. T. HUNT (Porth), there was a general discussion on the principles of co-partnership.

The meeting concluded with a vote of thanks to Mr. Octavius Thomas and Mr. Thorne, proposed by Mr. A. E. MARTIN (Merthyr Tydfil) and seconded by Mr. C. B. FELTON (Newport).

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Ellesmere Port.

There was a visit of the Association on Wednesday, Dec. 7, to the works at Ellesmere Port of the Ship Canal Portland Cement Manufacturers, Ltd., where they were received by Mr. Hodgson (Works Manager), Mr. Gillett (Chief Chemist), Mr. Cairns (Assistant Chemist), Mr. Millar (Engineer), and Messrs. Callie and Hulme (Sales Department).

The party first proceeded to the works wharf, a fine structure on the Manchester Ship Canal. Steamers arrive daily from the Company's Little Orme's Head Quarries, Llandudno, with limestone, which is discharged into storage bins or into wagons for haulage direct to the factory. Next the wet grinding department was visited. There the limestone is discharged from the wagons and conveyed to concrete silos. At this point, also, shale rock from the Company's Garth Shale Quarry, near Llandudno Junction, is dischaged, and elevated to separate concrete silos. The limestone and shale in proper proportion are taken from there to the grinding mills. The product leaving the mills—known as "slurry"—passes to circular concrete tanks equipped with mechanical mixing gear, which keeps the slurry in constant agitation. The slurry is next pumped to the rotary kilns. It is mechanically fed in at the upper end of the kiln, travels by gravity to the burning zone, where it encounters a temperature of approximately 3000° Fahr., and after conversion to "clinker" passes through rotary coolers, and is cooled to a temperature convenient for mechanical handling by gravity conveyors to the grinding department.

Pulverized coal is used for firing the kilns. As the clinker is being fed to the ball-and-tube mills in the clinker grinding department, the required amount of gypsum rock is added to regulate the setting-time of the cement to suit the consumer.

The laboratory in which the testing of raw materials and checking of the product during the various stages of manufacture are carried out is also available to customers and prospective customers. Tests are willingly carried out on clients' own raw materials, and advice is offered.

At the conclusion of the inspection, tea was served in the staff dining room, after which the following paper was read.

PORTLAND CEMENT AND ITS USES.

By H. J. GILLETT, Chief Chemist to the Ship Canal Portland Cement Manufacturers, Ltd.

[Extracted.]

The first patent for the manufacture of portland cement was taken out a little over a hundred years ago by Joseph Aspdin. He claimed that by mixing in certain well-defined proportions finely pulverized chalk with clay, and burning at a high temperature and grinding the product, he was able to produce a hydraulic cement far exceeding in quality any product known at that time. This material possessed the grey colour of portland stone, and thus received the name of portland cement. The manufacture of portland cement continued for some fifty or sixty years entirely on an empirical basis, and using almost solely soft raw materials of chalk and clay character. Crampton patented in 1877 a process for burning cement in a rotary kiln, but does not appear to have put his invention on a manufacturing footing. Ransome patented a rotary kiln in 1885 which may be taken as the earliest approach to a practical rotary kiln—a type of kiln which has since superseded all others. From time to time improvements in the rotary kiln have continued; the length and diameter having been gradually increased, until that generally adopted to-day as the most economical is 200 ft. in length and 10 ft. in diameter in the burning zone. Kilns and burning, however, are only one phase in the manufacture. Pulverization of all classes of material enters very largely into the process. Forty years ago we were content with a cement which left a residue of 10 p.ct. on a 2500-mesh sieve—that is, a sieve having openings of approximately 0·01 in. —while the present British standard specification requires not exceeding 10 p.ct. on a sieve of 32,400 meshes to the sq. in., the opening being 0·0038 in. All manufacturers grind to a much greater degree of fineness than this; and, further, all the raw materials used, including coal, are similarly pulverized.

You have to-day seen the process of the manufacture of cement carried out in a modern works, and there is therefore no need for me to describe the operation in detail. The limestone is quarried at our Little Orme's Head Quarry, and there crushed to 1½ in. and down, and conveyed by steamer to our wharf. The shale quarried at our Garth Quarry is also crushed to similar size and conveyed by rail to these works. There our two raw materials are proportioned, mixed, and ground at the wet mills; the whole operation being checked and controlled by a staff of chemists who are on continuous duty. Their function is to see that slurry of uniform composition is produced. While the raw material is in the slurry state, the chemist has absolute control, and can alter the composition at will—hence the importance of skilled control at this point. Once beyond the slurry state, there are no means of correcting an imperfect mix. With the methods of control on these works, absolute uniformity is assured, as far as it is humanly possible; and, further, the factory is so operated as to give the chemist every opportunity, with an abundant supply of material in hand, to correct and standardize that material before it gets beyond his control.

The slurry, having been passed by the chemist, is then calcined by going through the rotary kilns, which are fired by means of pulverized coal. The fired material, known as clinker, after cooling, passes to the ball and tube pulverizing mills. During the grinding process a small quantity of gypsum is added, in order that a cement of workable setting-time is produced. Here again the chemist functions fairly largely, and makes continuous tests for setting-time and fineness, in order to ensure a uniform cement. Thus the chemist is able to control, in the true sense of the term, the uniformity of the product. The finished cement is conveyed to the stock house to await dispatch. Beyond the hand labour in discharging raw materials from the wagons at the raw mills, hand labour is not employed until the actual dispatching of the cement occurs; and here it only amounts to trucking the mechanically filled bags away to the vans for dispatch. Otherwise, the whole operation of the factory is mechanical.

With regard to the improvements effected in the cement produced, one has only to compare the requirements of the British standard specification since the first publication of 1904.

—	1904.	1925.
Fineness, 180²	22½ p.ct.	10 p.ct.
,, 76²	3 ,,	1 ,,
Tensile strength, seven days—		
Neat	400 lbs.	600 lbs.
Sand	120 ,,	325 ,,

This alone suffices to indicate the progress in the industry. Needless to say, "England" brand cement far exceeds the strength required by the specification; the average tensile strength at seven days being: Neat, 825 lbs.; and sand, 445 lbs.

TESTING CEMENT.

The testing of cement is an expert's job. We are prepared to guarantee our cement exceeds the requirements, and to stand by the guarantee; or, if preferred, we issue a certificate giving the actual results obtained in our laboratory of any consignment of cement dispatched. Should the user require confirmation of this, we strongly advocate the employment of one of the independent testing firms who employ experts for such work. Amateur testing only invites erroneous, and often alarming, results, which are entirely due to the operator. With the advent of reinforcement, it is now fully realized that artistic structures can be as easily erected in concrete as in natural stone. Further, concrete structures continue to mature for many years. One thing that can safely be said for concrete structures is that they make for permanence. You will have seen to-day during your inspection of the works a few simple every-day uses of concrete—such as the raw material silos. Here is a series of silos, each with a capacity of 350 tons, with practically moving loads. The thickness of the reinforced concrete is 4½ in.; and these silos are elevated on piers 10 ft. above ground level, to facilitate discharging. Then there are the

chimney stacks 200 ft. in height, all of simple, rapid, and permanent construction.

IMPORTANCE OF THE AGGREGATE.

When considering a concrete structure, it is as well to remember that, after all, the portland cement used is only a very small proportion of the whole—the bulk of the structure being a filling material. The function of the cement is only that of binding together the filler or aggregate. This being so, the nature of the aggregate is of immense importance, as the strength and stability of the structure must necessarily be affected by the character of the aggregate used.

One of the first essentials for the aggregate is that it must be chemically inert. In this respect, we are fairly safe when we are dealing with crushed rocks or river ballasts; but when we touch such materials as furnace ashes, we are on dangerous ground.

Secondly, the aggregate must be hard. It is quite useless to fill in the voids between pieces of soft stone with a good cement mortar and expect a strong concrete. The strength will be substantially that of the stone.

Thirdly, the aggregate must be clean. A crushed rock will frequently be coated with adherent dust; a gravel may be coated with clay. In either case, the cement mortar will only come into contact during mixing with the dust or clay, and not with aggregate; hence only a very imperfect bond will be established. These remarks apply equally to the sand, which, further, should be graded, and not contain an unduly high proportion of fines.

An ideal concrete would be voidless; but as this is not possible, we must aim as near to perfection as we can. In order to do this, we must grade our aggregate so as to reduce the voids to a minimum. Too often we find specifications stating that the mix shall be 4 : 2 : 1, or 6 : 3 : 1, without any stipulation as to what is to be used in the way of aggregate. The result is that the concrete is either very porous or over-sanded.

Another point to be noted is that every particle of aggregate must be surrounded by a film of cement, in order that it may adhere to its adjacent particles. Therefore the finer the aggregate, the greater area there will be to be covered, and the more cement will be required to coat the entire area of aggregate. An intelligent examination of the question of aggregate pays. Not only will you get a sounder and better structure, but you will economize in the cement used.

One other word on concreting. There is a notion that plenty of water used in mixing gets the concrete well into place, particularly in reinforced work. Perhaps it does; but as the cement will only absorb chemically a certain amount of water, the excess has to dry-out, and results in porous concrete, which is very undesirable in reinforced work. Use only sufficient water to make the concrete just plastic enough for the job. Excess of water means weak concrete.

Mr. HODGSON (on behalf of the Directors) gave a hearty welcome to the guests; and Mr. APPLEBEE (Manchester) moved, and Mr. BROUGHTON (Haslingden) seconded, a vote of thanks to the firm for their kindness and hospitality.

Mr. GILLETT (who was thanked for his paper) stated that he would be pleased to answer any question that members might send him by post, as there was not time to do so then.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

On Wednesday, Dec. 7, the Association enjoyed a most successful visit to the Cyclops Tube Works of Messrs. Le Bas Tube Company, Ltd. The firm conveyed the members, who assembled at Tower Hill, to and from the works, which are situated at Millwall, E. 14, and did everything in their power to render the inspection of benefit.

On arrival at the works, the visitors were met by Mr. R. Osborne, the Managing Director, Mr. W. F. Wakefield, the Works Manager, and Mr. H. R. Hiscott, who was responsible for the organization of the visit. It will probably be remembered that, at a meeting of the South Wales and Monmouthshire Gas Salesmen's Circle on Nov. 10—see "GAS SALESMAN" for Nov. 30, p. 291—Mr. Hiscott read a paper on the "Manufacture of Malleable Iron Pipe Fittings." Though tubes are not manufactured at the London Works of the firm—as a matter of fact, there is no actual manufacture of tubes in London—there were plenty of processes to interest the visitors.

The tour of the works, which have a frontage of 300 ft. on the River Thames, commenced by an inspection of the fittings warehouse, where + GF + malleable iron tube fittings are stored. The firm have an excellent system for ensuring stock maintenance of the large variety of patterns and sizes. In this warehouse alone about eight thousand different bins are in use. Many of the fittings were laid out for inspection.

The machine shops were next visited, in which up-to-date equipment for pipe cutting and screwing is installed. Some of the machines are semi-automatic and capable of dealing with 2000 threads per working day.

In the welding and erecting shops the members were able to see various types of coils for heating, refrigeration, and other purposes in course of manufacture. There are machines of special make for homogeneously joining together long lengths of mild-steel tube by butt welding by the electric resistance method; and there were seen various kinds of branch welding by the oxy-acetylene system. It was here also that a demonstration was given of the testing of a coil at an air pressure of 1000 lbs. per sq. in. while submerged in water. This pressure is supplied by a three-stage compressor of special design.

Mild-steel tubes are bent to a great variety of shapes by different methods; and what particularly interested the members of the Association was a length of tube, previously welded by electricity, passing into a furnace and coming out at the other end red hot, and then being coiled on a specially constructed machine.

In another shop was seen the manufacture of short standard steel bends. The steel pipe construction and bending shop was the next item of interest. In this department all sizes of flanged or screwed and socketted pipes are dealt with. The care with which this work is done was the subject of appreciative comments by the visitors. The manipulation of pipes on various furnaces and slabs was demonstrated, for several bends were in course of manufacture. In this shop, too, complete quasi-arc welding was in evidence.

Following inspection of the stock yards, where are stored large quantities of gas and steam quality tubes, the visitors were conducted to the warehouses, where there are large supplies of fittings ready for immediate dispatch.

Afterwards the visitors were entertained at tea by the firm.

Mr. LEONARD LACEY (President of the Association) voiced the members' appreciation of what had been a most interesting visit, particularly to those on the distribution side of the gas industry. It was, he said, the first time he had inspected such a works; and he had been extremely interested in the arrangements made for the bending of pipes and for the manufacture of coils, which processes accounted for a good deal of the work carried on. The works also acted as a clearing station for fittings.

Mr. A. G. GODLY (Commercial Gas Company) proposed a vote of thanks to the Le Bas Tube Company, coupling with it the names of Mr. Osborne, Mr. Wakefield, and Mr. Hiscott. In doing so he referred to the fact that the furnaces they had seen in operation employed oil as the heating agent, and he expressed the hope that gas would eventually supplant oil for this purpose.

Mr. W. L. WESTBROOK (North Middlesex Gas Company), in seconding the vote, remarked that the ease and the methodical manner in which the workmen's operations were carried out were very impressive. As for the testing arrangements, these were so excellent that it was highly unlikely that any piece of defective work would escape detection.

Mr. OSBORNE, replying, said how pleased he was to have the opportunity of welcoming the Association. With regard to the use of gas in the furnaces which were now fired by oil, it had hitherto been found that gas was too expensive. If, however, improvements in gas furnaces, or reductions in the price of gas, could place it on a competitive basis, he would be only too glad to have it installed. He would certainly consider very carefully any suggestions the gas undertakings might put forward.

Mr. WAKEFIELD, who also replied to the vote, expressed similar sentiments. He mentioned that gas was employed in some of the blowpipes which were used for short bending, and also for the sweating-on of pipes.

The "Practical Engineer" Mechanical Pocket Book and Diary, 1928.—The 1928 edition of this useful handbook has just been published; and for it all the notes and tables have been revised carefully, and numerous improvements have been effected. In some cases new notes have been introduced, and in others the existing notes have been rewritten, extended, or condensed, in accordance with progress recorded during the past year. Mr. Humphrey Milford, Oxford University Press, Technical Department, Falcon Square, E.C. 1, is the publisher; and the price of the volume is 2s. 6d. net in cloth and 3s. net in leather cloth.

Britain's Fuel Problems.—"The Fuel Economist" have published, at £2 2s. net, a volume bearing this title. It is the work of a group of editors and contributors, each a specialist in his own branch of work. A review of the book will appear shortly.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Properties of Glycerine-Water Mixtures.

Sir,—Your correspondent Mr. Knowles, in your issue of Dec. 7, has questioned my statements relating to the possible use of glycerine as an agent for drying gas. I have re-examined the data on which these statements were based, and claim that they are quite accurate.

The vapour pressures of glycerine-water mixtures are easily found in various standard publications; and I repeat my previous statements, which were:

The solution of glycerine which approximates in vapour pressure to the solutions of calcium chloride used in the process I describe, contains about 86 p.ct. of glycerine.

It is very viscous.

It falls within the range (see "Dictionary of Applied Chemistry") which is subject to measurable losses on heating for the purpose of re-concentrating.

Moreover, the strength of 75 p.ct. quoted specifically by your correspondent as giving a possible removal of 75 p.ct. is found to have only the power of removing *not much more than* 40 *p.ct. of water vapour.*

If Mr. Knowles has figures which do not conform to these, it is not asking too much of him to publish them, and state his authority. I am quite prepared to show how my own figures may be confirmed by very simple tests.

The point your correspondent makes to differentiate the absorptions in the two media seems to me to be quite illusory. The mechanism of absorption is the same in both cases, and the difference lies merely in what happens to the water after absorption.

C. Harris.

Taunton Gas Light and Coke Company,
Dec. 12, 1927.

A Suggestion.

Sir,—May I suggest that, in order to check the periodic outcry of "excessive gas consumption" which has in recent years become epidemic at least in the London area, the undertakings should publish monthly statements giving the gas made for this and the corresponding period of the former year, with percentage increase or decrease, and such other details as may suggest themselves to the management.

I found this practice a most effective check against misapprehension. It prevented those who from any cause had experienced an excessive consumption from "starting the hare."

W. R. H.

Dec. 8, 1927.

Explosion in a 24-Inch Gas Main.

Sir,—Your correspondent stated in your issue of Nov. 23 that a 24-in. main had just been laid from one of the station governors for a distance of 500 yards. Without a plan of the connections, it is difficult to theorize about the matter; but it has occurred to the writer that in such a case as this an explosion might be caused in the following manner.

Let us assume that on the inlet side of the governor, and several feet before the valve connected to the new main, is a service connection leading to a jet photometer, a calorimeter, a lamp, or some other flame. On opening the valve under the conditions stated, an ignitible mixture would be formed extending for several feet back from the governor, which would be detonated by the flame from the jet photometer or other naked light. An explosion would follow, which would probably exert its maximum force at a distance from the point of ignition. In fact, the gas main might be compared with a gas engine cylinder; the light taking the place of the ignition tube.

Your correspondent may explode this theory by stating that the facts do not support it; but there is no harm in drawing attention to this risk, which is, in the writer's opinion, sometimes overlooked. It would be a wise precaution in many instances to fit jet photometers and calorimeters either with a water seal or wire gauze to prevent flashing back in the event of the main to which they are connected becoming charged with an explosive mixture.

W. W. Townsend.

Colchester Gas Company,
Dec. 8, 1927.

Dry Oxide Purification.*

Sir,—Mr. J. W. Thompson's advocacy of dry oxide purification, in a paper submitted by him to the Manchester District Institution of Gas Engineers on Thursday, Nov. 24, comes as a surprise. He believes that many purification failures are the result of excess of moisture in the prepared oxide. While this is doubtless true, it may be equally legitimate to ascribe the failures to insufficiency of water in the oxide, for it is a fact that an oxide which has been completely dried is practically inactive. As W. A. Dunkley and his collaborators have shown—and many of their small-scale experiments have been confirmed in practice—activity is intimately connected with oxide surface. The greater the exposed surface, the better the purification results. Excessive water excludes the sulphuretted hydrogen from contact with the oxide surfaces—it water-logs the oxide, and thus decreases its activity. On the other hand, when an oxide is dried, the structure contracts; the surface exposed becomes less, and activity decreases. There is, therefore, an optimum moisture content at which an oxide is most active, which content is not a fixed quantity for all oxides, but has to be determined for each variety.

There can be little doubt that in the past oxide purification was carried on more as a rule-of-thumb process, albeit in most instances effective, than a scientifically-controlled one. Even at this enlightened day, there is often crudity in its operation; and Mr. Thompson has done good service by bringing an important subject once more into the limelight.

Regarding such a complex process, however, the author's statements seem too good to be true, and in one respect he appears to contradict himself. Having urged that from the point of view of efficiency, dry oxide should be employed, he points out that its use will help in the modern aim of dry gas. How? By condensation of the moisture as the gas passes the purifiers, provided, of course, that the temperature in the latter is lower than that of the entering gas—a non-desirable condition. This moisture must be deposited on the surfaces of the oxide, and thus, after a certain time, impair its activity. In any case the system can no longer be termed "dry oxide purification."

Mr. Thompson did not mention the part which heat plays in the process. Oxide activity is a function of temperature; and here, again, there is an optimum point for each variety of oxide—on an average about 120° Fahr. It is impracticable, however, to work at this temperature; and one about 80° Fahr. is generally adopted. At all events, it is desirable that the temperature of the boxes should be higher than that of the incoming gas. It follows that, unless there is some compensating influence, no oxide can retain its optimum moisture content when a gas saturated at (say) 60° Fahr. passes out of the boxes at a higher temperature. Control in this respect, however, should be comparatively simple. The amount of water vapour carried by a gas saturated at the inlet temperature is known, and the increment necessary to maintain saturation at the outlet temperature can be added as steam, which will have the dual effect of preventing condensation on the oxide and of raising the temperature of the boxes. If additional heat is required for the latter, closed steam-coils utilizing otherwise waste steam can be employed.

Investigator.

Nov. 30, 1927.

* The paper is published on an earlier page in this issue.

Nuneaton Gas and a Two-Part Tariff.

Sir,—I do not like replying to criticisms contained in anonymous letters; but I fancy I know your correspondent. That he is not managing the accountant's or engineer's side of a gas-works is fairly obvious.

Taking just three points to begin with in "Engineer's" letter:

1. He says the National Gas Council have been considering the two-part charge for gas for over twelve months.

Presumably "Engineer" thinks I am not entitled to any honour for my contribution to the subject. Let me say at once I would not rob the National Gas Council for worlds—such an august body requires all the honour it can get. I have my work.

In this connection, may I be permitted to say, as an example of the honour associated with collectivism, that within the last few days an emissary of or from "vested interests" has taken the pains to arrange a private interview with my Chairman, in order to point out to him that what is being done at Nuneaton in the manufacture and distribution of low-grade gas is all wrong! The gentleman concerned may have been acting for one of the august bodies who represent us. I once remember poor old John Carter at a London meeting, in one of his flights of rhetoric, saying in some connection or other: "How great a man may become." I, alas, have to add to this—"or how small."

2. "Engineer" says that it would appear that Helps, in putting forward the proposal that gas should be sold generally at the ridiculously low price of 4d. per therm, must really mean 4d. as one part of a two-part charge.

My reply to this is that I mean nothing of the kind. Gas can be sold in any city and town in the country at an average "*all-in*" price of 4d. per therm. My meaning will be made abundantly clear if your correspondent will read the enclosed pamphlet as to how Glasgow can sell gas at an average price of 3½d. per therm. What applies to Glasgow applies generally.

3. "Engineer" says that in the case of Nuneaton, if I sold gas at 1s. per week for service, and 4d. per therm, the service fee would amount to 10½d. per therm, &c.

Before letting myself go on this part of "Engineer's" letter, I should like his assurance that I am not misunderstanding him. He may like to reconsider what he has written. If he has no qualification to make, then it would be well if he insured his life before my onslaught takes place.

George Helps.

The Nuneaton Gas Company,
Queen's Road, Nuneaton,
Dec. 10, 1927.

Remembrance Day Appeal.

Sir,—I am writing to express my deep appreciation of the generous way in which the whole of the Press have once again co-operated in my Remembrance Day Appeal on behalf of distressed ex-Service men and their dependants.

This year's Appeal has proved an outstanding success, due in a very large measure to the excellence of the publicity which has been given; and with my own grateful thanks for this help, I would like to couple the gratitude of those for whom I appeal. Haig, F.M.

Appeal Department for British Legion,
26, Eccleston Square,
London, S.W. 1,
Dec. 6, 1927.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

Scientific Research.

Mr. C. EDWARDS asked the President of the Board of Education whether he could furnish the details of the arrangement entered into between the Fuel Research Board and the Gas Light and Coke Company in reference to the installation of bye-product plant at the works of the latter; and whether there was any agreement which provided that the Gas Light and Coke Company had the option of purchasing the plant if operations were successful.

The DUCHESS OF ATHOLL replied that details of the arrangements made with the Gas Light and Coke Company and the Fuel Production Company regarding the installation of a carbonization plant at the Richmond Works were given on May 11 last. The answer to the second part of the question was in the affirmative.

Reinstatement of Gloucester Main Roads.

Sir T. DAVIES asked the President of the Board of Trade if he was aware that in the Bath Gas Special Order, as presented to the House and proposed to be made by the Board of Trade, no clause has been inserted for the protection of the Gloucestershire County Council with regard to the reinstatement of county main roads which might be broken up for the purpose of laying gas mains, &c., similar in effect to the clause which had been inserted for the protection of road authorities by the Ministry of Transport and by the Electricity Commission in the Cheltenham Electricity (Extension) Special Order and the West Gloucestershire Electricity (Extension) Special Order, respectively, to all of which Orders the provisions of Section 10 of the Gas Works Clauses Act, 1847, as to the reinstatement of roads applied; and, if so, what was the reason for the omission.

Sir B. CHADWICK said he was aware of the facts to which his attention had been directed. He understood, however, that the clause to which reference had been made was, in each of the instances cited, ultimately agreed to by the respective promoters, though, in the first insance, objection had been taken. In the case of the Bath Order no agreement was reached, and, at the public inquiry which was held, no circumstances peculiar to Bath were alleged to exist. Accordingly, there appeared to the Board no valid reason for departing from the provisions of the general code relative to the reinstatement of roads opened by public utility bodies. As late as November, 1925, similar questions were carefully considered in connection with the Northampton Gas Order, and in that Order the Board's decision was upheld.

REGISTER OF PATENTS.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Nov. 23.]

Nos. 30,458—31,163.

AUTY, A. B.—"Valves for controlling flow of gases." No. 30,981.
BARRALET, J. H.—"Geysers." No. 31,028.
CLAPHAM, T. A.—See Auty, A. B. No. 30,981.
EVANS, E. V.—"Manufacture of coal gas." No. 31,140.
FENLON, G. T.—"Lubricating means for gas meters." No. 30,498.
FORSANS, P. E. H.—"Oven for distillation, &c., of solid fuels." No. 31,124.
GRASEBY, R. C.—"Prepayment meters." No. 30,507.
MANN, H. C.—"Treatment of gases." No. 30,870.
MOORE, H. S. and S.—"Water-tube condenser." No. 30,476.
MORRIS, G. R.—"Taps for gas." No. 30,751.
NEW GEYSERS, LTD.—See Barralet, J. H. No. 31,028.
NORGATE, R.—"Washing coke." No. 30,563.
OTTO & CO., GES., DR. C.—"Coke-quenching appliances." No. 31,051.
PARKINSON & COWAN (GAS METERS), LTD.—"Wet gas meters." No. 30,805.
SILICA GEL CORPORATION.—"Processes of removing sulphur compounds from gas mixtures." No. 31,058.
SMITH, E. W., and SMITH METERS, LTD.—See Fenlon, G. T. No. 30,498.
SMITH, W. A.—"Air and gas washing apparatus." No. 30,482.
SOUTH METROPOLITAN GAS COMPANY and STANIER, H.—See Evans, E. V. No. 31,140.
THORP, F.—See Parkinson & Cowan (Gas Meters), Ltd. No. 30,805.

[Extracted from the "Official Journal" for Nov. 30.]

Nos. 31,164—31,917.

BREGEAT, J. H.—"Purifying gases." No. 31,682.
COLEY, H. E.—"Manufacture of gas." No. 31,636.
COMPAGNIE POUR LA FABRICATION DES COMPTEURS ET MATERIEL D'USINES A GAZ.—"Liquid measuring apparatus." No. 31,400.
GUHL, H.—"Gas burners." No. 31,795.
HUMPHREYS & GLASGOW, LTD.—"Apparatus for making carburetted water gas." No. 31,280.
HUMPHREYS & GLASGOW, LTD.—"Vertical fire-tube boilers." No. 31,281.
PERRESS, J. H. L.—"Gas turbines." No. 31,475.
STUDIENGES FUR GASINDUSTRIE.—"Adsorption and drying of gases." No. 31,555.

LEGAL INTELLIGENCE.

PUBLIC LIGHTING DISPUTE AT CREDITON.

Sitting in the Chancery Division, on Thursday, Dec. 8, Mr. Justice RUSSELL heard litigation in which the Crediton Gas Company sued the Crediton Urban District Council, asking for a declaration that a notice dated April 30, 1927, given by the Council to the Company, which purported to determine, as on Aug. 31 last, a contract dated March 30, 1909, and a supplementary agreement of June 30, 1921, made between the parties for the lighting by the Company of the area within the jurisdiction of the Council, was of no effect and inoperative. The Company also applied for an injunction to restrain the Council from acting on that notice.

Mr. BENNETT, K.C., and Mr. ROBERTSON appeared for the Gas Company; Mr. SPENS, K.C., and Mr. BUCKMASTER, for the Council.

Mr. BENNETT explained that the whole question was whether a certain notice was, or was not, valid. The matter arose out of two agreements made in 1909 and June, 1921, respectively—the latter one being arrived at after the hearing of certain litigation before Mr. Justice Astbury in the Chancery Division. Counsel argued that neither of those agreements contained any express provision enabling either party to put an end to them; but on April 19 this year the Council gave the Company notice to determine both agreements on May 1. Apparently defendants did not feel very satisfied about the notice, for on April 30 they gave plaintiff another notice—this time to determine the agreement on Aug. 31. This notice was accompanied by a letter from the Council in which the Clerk stated that it was desired to give the plaintiffs the longest possible notice to determine the contract; and they withdrew the notice of April 19. The matter would depend entirely upon the construction of the agreements; and he believed the defendants would argue that they had a right, at the will of the Council, to put an end to them, having regard to the contents of the recital to the agreements. The Company was incorporated by the Crediton Gas Act, 1906. The undertaking taken over by the Company was an old one, for it was established in 1843. It was common ground that before March, 1909, there was no written agreement in existence for the lighting of the town; but gas was being supplied for this purpose. Just before March, 1909, there were negotiations on foot between the Company and the Council, in the hope of a written contract being arrived at to define fully the rights and obligations with regard to the public lighting. The parties seemed, however, unable to come to any agreement until the Local Government Auditor took the view that such an agreement should be arrived at. On his representation, an agreement was entered into; and under that agreement, said Counsel, in his opinion, the Council had no power to end the supply of gas carried out by virtue of it. The defendants contended that they had that power; but really the whole document was very ambiguous on the point. He regarded it as a permanent one, with no provision for its termination.

Mr. SPENS said the town had now been lighted by electricity. The Council had paid the Gas Company £500 a year. He contended that the document implied in terms that defendants had a right to terminate the agreement.

His LORDSHIP agreed that the Company were right in their contention that there were no words in the agreement by which it could even be implied that either party could terminate the agreement, and that it was of a perpetual nature. But this did not dispose of the action, because the Council had argued that, even when there was no clause in the agreement for determination of the contract, the very nature of the agreement was such that there must be power to either party to end it. It was a simple agreement for the acquisition by the Company of a customer of a certain kind; and it therefore followed that either party could decide no longer to give or accept a service. He was of opinion that, as the Council had given proper notice that they no longer required a supply of gas for street lighting, that notice was valid; and the Company's claim was dismissed with costs.

ACTION REGARDING TAR SUPPLIES.

A Court of Appeal, consisting of Lords Justices SCRUTTON and ATKIN and Mr. Justice EVE, on Friday, Dec. 9, heard particulars of litigation between Messrs. Crow, Catchpole, & Co., Ltd., and Messrs. Burt, Boulton, & Haywood, Ltd., arising out of the "Tar Pool." There are two actions; and the Court was concerned with interlocutory appeals against the orders of Mr. Justice Swift and Mr. Justice Roche sitting in Chambers, and dealing with matters of a technical character which precede the appearance of the causes for trial.

Mr. W. A. JOWITT, K.C., and Mr. FORTUNE appeared for Messrs. Crow, Catchpole, & Co.; and Mr. PRITT, K.C., and Mr. H. MURPHY for Messrs. Burt, Boulton, & Haywood.

Mr. JOWITT explained that the "Tar Pool" was an organization in which a number of big concerns joined for the purpose of assuring that each secured a supply of tar for commercial purposes. They entered into an agreement the nature of which was well known; and the allegation was that the defendants were in arrear with their contribution. He understood that they were perfectly willing to admit the arrears, which, it was said, were of considerable quantities; but they pleaded that they could not contribute to the pool tar they received under what was called the "Prince Regent" agreement they had entered into. The plaintiffs claimed that they were entitled to have the tar; and they relied upon a clause of the agreement which covered, they said, a case of this sort. Mr. Justice

Roche considered that agreement did not operate. He thought the matter was one for an Arbitrator. There was no question about the amount of tar; but there was a question whether damages for non-compliance with the pooling agreement were sufficient, and whether the plaintiffs could not claim the delivery of the tar. Supposing the defendants had to deliver the tar, that could only be done by an order of the Court; and in the circumstances the plaintiffs argued that if the case had to come to Court it might just as well come there straight away, and not be delayed by litigation before the Arbitrator. This brought him to the second chapter, which started with the issue of a writ in November, in which the plaintiffs sued Messrs. Burt, Boulton, & Haywood; and the action also concerned the South-Eastern Tar Distillers, Ltd. The plaintiffs claimed an injunction to restrain the defendants from acquiring, or attempting to acquire, any tar from certain sources in contravention of the pool agreement. What had happened was that the defendants had taken a prominent part in forming the South-Eastern Tar Distillers, which was evolved from a small Company with a capital of £100 in shares, of which only 55 were subscribed. The defendants used that Company to set up business within the area covered by the pool agreement. The capital of the Company was thereupon increased, and had now become £30,000. Messrs. Burt, Boulton, & Haywood controlled exactly half the shares, with some people called Lane; and things were so arranged that neither should have a "pull" on the other. Plaintiffs alleged that such an arrangement was contrary to the defendants' obligations to their pool; and they argued that the South-Eastern Tar Distillers had been guilty of a tortious act towards the plaintiffs by assisting the defendants to evade their suggested obligations. The application for an interim injunction came before Mr. Justice Swift; and that was countered by an application by the defendants to stay the action as against Mssrs. Burt, Boulton, & Haywood. The Judge had made the order. What the plaintiffs would like would be to get the whole case before the Commercial Judge in the King's Bench Division, and ask for a speedy trial.

After hearing Mr. PRITT,

Lord Justice SCRUTTON said that in the course of the argument it had transpired that both actions had been stayed by the Judges in chambers; and the appeal was against both decisions. With regard to the second action, the Court thought it desirable to know more precisely what the proceedings were; and therefore the case would be adjourned for the preparation of pleadings. With regard to the first action, in which the arbitration clause appeared, the agreement was between four firms of tar distillers, and it contemplated that the tar received should be pooled and then distributed in specified quantities to the distillers. The plaintiffs alleged that Messrs. Burt, Boulton, & Haywood were not making deliveries to them of the quantities under the pooling agreement, and that damages for non-delivery were not adequate; so they asked for specific performance of the agreement to deliver, in preference to damages or share of profits. Plaintiffs said the Arbitrator could not give them the specific performance of the agreement that they required. In his opinion, it was extremely improbable that the Court would make an order for specific performance of a complicated commercial agreement which could not be performed in the time, but must involve, if carried out, supervision by the Court of the performance of the agreement. His Lordship attached small importance to the plea that the remedy required was one the Arbitrator could not give; and he thought the Court would decline to give the remedy in the case he had mentioned. The appellants had not shown sufficient reason why the arbitration clause should not be carried out; and therefore the decision of Mr. Justice Roche to send the matter before an Arbitrator was the correct one. The appeal in that case would be dismissed with costs.

Mr. Justice ATKIN and Mr. Justice EVE concurred.

CHALK FUEL, POWER GAS, AND BYE-PRODUCTS CORPORATION.

Defendants Committed for Trial.

The hearing of the summonses against Sir Charles B. Herne-Soame, Bart., Robert George Harley, and Lieut.-Col. Edmund Octavius Eaton, in connection with the activities of the Chalk Fuel, Power Gas, and Bye-Products Corporation, was concluded on Thursday, Dec. 8, at the Mansion House Police Court, London, by Alderman Sir GEORGE TRUSCOTT. This was the fourth hearing, the previous three having been reported in the "JOURNAL" for Nov. 9, p. 398; Nov. 23, p. 559; and Dec. 7, p. 694. The allegation was that the defendants had conspired to obtain money by falsely pretending that certain reports appearing in the prospectuses and pamphlets issued by the Corporation, with regard to a fuel consisting largely of chalk, were true and genuine reports.

Mr. *William Hoskins*, Abbey Farm, Eynsham, Oxfordshire, gave evidence to the effect that in 1920, having been impressed by the reports with regard to the chalk fuel contained in literature he had received from the Corporation, he applied for 160 shares, and paid £43 15s. in respect of them. He had also applied for 10 founders' shares. From time to time he had written letters to the Corporation asking why he had not received dividends, but was not satisfied with the replies. He had also asked for his money back. In November, 1926, having become disgusted, he burned the literature, the correspondence, and the certificate in respect of the 160 shares; but he produced the certificate in respect of the founders' shares.

Cross-examined by Mr. J. P. VALETTA, witness said he had not received a balance-sheet. He agreed that the Corporation had not stated that profits had been made; but, so far as he remembered, neither had they stated that profits had not been made.

Mr. *C. W. Adcock*, representing a firm of printers at Eastbourne, gave evidence with regard to the printing in 1926 of pamphlets, prospectuses, &c., on behalf of the Corporation. He referred to Board meetings he had attended in connection with the matter, at which he had met Mr. Harley and Col. Eaton, and said he had received instructions from Col. Eaton, for whom his firm had previously carried out printing orders. The Chalk Fuel Corporation still owed his firm more than £200. In 1926 he received two post-dated cheques, each of £100. These had been presented for payment on a number of occasions, but without success. There were three signatures on the cheques, two of them being the signatures of Mr. Harley and Col. Eaton.

Cross-examined, witness agreed that the orders were fulfilled for the Corporation, to whom the invoices were made out; and the cheques were on account of the Corporation.

Detective-Inspector *W. Greer* (of the City of London Police) gave evidence as to the inquiries he had made in regard to the activities of the Corporation. He received the complaint of the Rev. H. H. Bartrum in June, 1926, and visited No. 4, Great St. Thomas Apostle, in the City, which had been given as the address of the Corporation. On the fourth floor there were three small offices; and a small piece of headed letter paper, bearing the name of the Corporation, was posted on one of the doors. After having visited that address on several occasions, he made inquiries, and eventually found Mr. Harley in the office at 121, Cheapside. He asked for the original report made by Mr. Franklin; and Mr. Harley replied that he could not find the report then, but was satisfied that it was perfectly authentic. In July, 1926, witness was making inquiries as to the report made by Mr. Mackey (the chemist who had examined the fuel), and pointed out to Mr. Harley that the report, as published in the prospectus, was alleged to contain discrepancies. The reply was that the prospectus was compiled by the Corporation's legal advisers, in consultation with certain experts. Some of the documents had been signed by Mr. Harley as Secretary. In November, 1926, witness again called on Mr. Harley, and asked for the Corporation's minute book relating to the reports of Mr. Franklin and Mr. Mackey, and repeated his request for the original reports as well. Mr. Harley's reply was that the book and the reports were in the possession of Col. Eaton, at his residence at St. Leonards; but that he proposed to visit Col. Eaton in a day or so, and would try to get them. Witness agreed to call, therefore, a week later; but on his arrival he was informed that a telegram had been received from Mrs. Eaton to the effect that Col. Eaton had to undergo a serious operation, and would be unable to attend to business for at least two months. Witness added that he had not succeeded in obtaining either the reports or the minute book, and subsequently summonses were issued.

Cross-examined, witness said he was satisfied that Col. Eaton did undergo a serious operation.

Mr. PERCIVAL CLARKE (Counsel for the prosecution) asked that the defendants be committed to take their trial at the Central Criminal Court. He pointed out that Sir Charles B. Herne-Soame and Mr. Harley were Directors of the Chalk Fuel Corporation. As Col. Eaton was not a Director, Counsel did not ask that he be committed as a principal; but, in order that his position might be clear to himself and others, that he be committed for having aided and abetted the Directors in the alleged offence.

The defendants pleaded not guilty, and reserved their defence.

Mr. VALETTA submitted that there was no justification, on the evidence, for committing Col. Eaton.

Sir GEORGE TRUSCOTT said he thought there certainly was. He thereupon committed the defendants for trial at the next session of the Central Criminal Court, beginning January 10, 1928.

Defendants were allowed bail in their own recognizances of £1000 each.

Unpaid Account for Clinker.

In the King's Bench Division, on Dec. 9, before the Lord Chief Justice, the Gas Light and Coke Company secured judgment for £174 and costs against Edward Mann, trading as Mann & Sons, of Scrubbs Lane, E., for clinker supplied. Mr. Walter McDowell, Chief Officer of the Company's Stores, gave evidence that the clinker was supplied to the defendant, who did not put in an appearance to defend the proceedings, although he pleaded that the clinker was supplied to one of his employees, who accepted it without authority.

Heathfield and Waldron Gas Company.

In the Chancery Division of the High Court of Justice, on Dec. 6, Mr. Justice Romer had before him a petition by Messrs. Hull, Blyth, & Co., Ltd., of Lloyds Avenue, London, E.C., for the winding-up of the Heathfield and Waldron Gas Light and Coke Company, Ltd. Counsel appearing for the petitioners explained that this was a petitioning creditors' action; the amount of the debt being about £75. He was informed that the Company had approached the petitioning creditors with a view to the settlement of the claim; and he therefore asked that the petition should stand over for a week. His Lordship assented to the adjournment.

Big Demand for Gas Apparatus in Birmingham.—The Birmingham Gas Committee report that at the present time orders are being received in large numbers for gas apparatus. During the quarter ended September last, 7771 orders for domestic appliances on hire purchase and permanent hire were received; the corresponding figures for 1926 and 1925 were 7419 and 5437 respectively. With regard to industrial heating apparatus, a number of large furnaces are being installed within the Department's area of supply; and the demand for the small type of industrial apparatus is increasing rapidly. During the six months ended September, there was an increase of 3546 in the prepayment meters and of 1859 in the ordinary meters fixed within the Department's area. All these meters represent new supplies.

MISCELLANEOUS NEWS.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

Physical and Chemical Survey of the National Coal Resources.

Lancashire and Cheshire Survey Committee.

The Physical and Chemical Survey of the National Coal Resources is one of the main aspects of the fuel research work of the Department of Scientific and Industrial Research. In pursuance of the Department's policy of carrying out the work by means of local committees appointed in coal areas to advise upon the course of work in those areas, the first Committee to be appointed was one to deal with the coalfield of Lancashire and Cheshire. In this area there already existed a research association formed by a number of colliery companies, and known as the Lancashire and Cheshire Coal Research Association. An arrangement was made whereby the Association agreed to carry out the work and to appoint, for its direction, a special Executive Committee including representatives of the Fuel Research Board and the Geological Survey of Great Britain.

This Committee has recently been enlarged in order that it should be representative of the whole coalfield; and its composition is now as follows: Messrs. R. A. Burrows (Chairman), J. T. Browne, H. O. Dixon, J. H. Edmondson, R. Landless, J. Lomax, J. T. de Seyfried, N. Simpkin (Director of Research to the Lancashire and Cheshire Coal Research Association), F. S. Sinnatt (representing the Fuel Research Board), T. Stone, and W. B. Wright (representing the Geological Survey of Great Britain).

Committees are also actively at work in the following areas: Durham and Northumberland, South Yorkshire, Nottinghamshire and Derbyshire, and North Staffordshire. Another Committee is dealing with the coalfields of Scotland.

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.

Electricity (Extension) Order.

An Extraordinary General Meeting of the Company was held on Dec. 8—Mr. R. W. EDWARDS, Chairman and Managing Director, presiding.

The CHAIRMAN said: You will no doubt remember that it was necessary to call you together on April 15 last year for a purpose somewhat similar to that for which the present meeting is convened—namely, to authorize an application by the Company to the Electricity Commissioners for an extension of the area within which the Company may distribute electricity.

I am pleased to tell you that the Special Order which followed the application of April, 1926, was finally confirmed in the House of Commons on Tuesday, Dec. 6 of this year. Its progress has been extraordinarily slow, and delayed by various factors, not the least of which was the uncertainty of the general position regarding electricity supply. That uncertainty is now happily resolved by the publication of certain schemes which are to be operated by the Central Electricity Board.

It is, I think, common knowledge that the Central Electricity Board was brought into being by the 1926 Act, and endowed with comprehensive powers to develop regional schemes, which would in the first instance be mapped out by the Electricity Commissioners. One of such schemes, termed the South-Eastern England Scheme, published early last October, covers the Administrative County of London and the whole or parts of the counties of Bedfordshire, Berkshire, Buckinghamshire, Cambridge, Essex, Hampshire, Hertfordshire, Huntingdon, Kent, Middlesex, Surrey, and Sussex.

The objects of the scheme are to centralize, at certain geographical points, the generation of current, with a view to minimizing operating costs; to standardize methods of supply into one system of three-phase, with a fixed periodicity of 50 cycles per second, so as to simplify distributing problems; and to develop districts in order to permit of supplies of energy being more readily available at prices ultimately more comparable with those applying in the large centres—although, perhaps, not so low as an optimistic Press has predicted.

With such objects, we have informed the Central Electricity Board of our willingness to co-operate, though we have also made representations to them as to certain aspects and details of the present scheme, which in our view could be still further improved.

It will, perhaps, not be amiss if I give you now a brief résumé of our history as an authorized electricity undertaking.

Our first electrical charter was obtained by the Act of 1909, which empowered us to supply the urban districts of Farnborough, Fleet, and part of Frimley, with many contiguous rural areas totalling some 54 sq. miles. The system was mapped out, and in late 1914 the supply commenced. Since then, apart from the moribund years of the war and its aftermath, we have been progressing steadily. The 1927 Special Order adds a further 83 sq. miles to our electrical territory, by embracing such places as Hartley Wintney, Hook, Odiham, Winchfield, Wanborough, Puttenham, Elstead, Thursley, and other parishes.

As an indication of the steady growth of this side of the Company's business, I illustrate the output of electricity, in units, as follows:

1915. . . .	First year	..	51,222
1919. . . .	Fifth year	..	180,260
1924. . . .	Tenth year	..	697,779
1927. . . .	Thirteenth year, estimated to exceed	..	1,000,000

We are, however, attracted by the facilities of the Central Electricity Board's Scheme to increase our electrical area further by bringing in such other territories as remain unprovided for and lie contiguous or within convenient reach either of the Company's present means of supply or of the network of primary and secondary mains which are to be laid down by the Central Board in the comparatively near future. Our present application accordingly includes parts of Surrey, Sussex, and Hampshire, comprising the whole or parts of the parishes of Witley, Hambledon, Godalming, Rural, Chiddingfold, North Chapel, Kirkford, Wisborough Green, Rudgwick, Lurgashall, Lodsworth, Ewhurst, Holybourne, Neatham, and Binstead.

In our desire economically to co-operate with the Central Electricity Board in the development of the uncharted areas, it is not unlikely that the Directors may come to the shareholders again with a further programme of expansion; but the proprietors may rest assured that no step will be taken or recommended unless there is some reasonable anticipation that an adequate return will be realized in respect of the proposed expenditure of capital.

I now formally move:

That the application of the Company to the Electricity Commissioners for a Special Order under the Electricity (Supply) Acts 1882 to 1926, authorizing the further extension of the electrical limits of supply of the Company and the expenditure of the capital of the Company within such extended limits be and the same is hereby approved.

PARKINSON STOVE COMPANY (AUSTRALIA), LTD.

New Factory at West Footscray, Melbourne.

We learn from the Parkinson Stove Company, Ltd., that they have been advised by cable that on Dec. 7 the new factory of the Parkinson Stove Company (Australia), Ltd., at West Footscray, Melbourne, was officially opened by the Hon. E. J. Hogan, M.L.A., the Premier of Victoria, in the presence of a large and influential gathering, including members of the Government, the Lord Mayor of Melbourne, leading industrialists, and directors, engineers, and secretaries of gas companies.

Sir HENRY COWAN, M.P., Chairman of Parkinson and W. & B. Cowan, Ltd., and of its subsidiary and associated Companies (of which the Parkinson Stove Company (Australia), Ltd., is one), being at present on a visit to the Dominions, was able to receive the visitors. At a luncheon following the opening ceremony, the success of the Parkinson Stove Company (Australia), Ltd., was toasted, on the proposal of the Premier of Victoria, supported by Mr. Philip C. Holmes Hunt.

The establishment of an Australian factory, through a subsidiary, for the manufacture of the appliances of the Parkinson Stove Company, Ltd., which have for several years been in increasing demand, was becoming a matter of importance; and in March last, Mr. D. MacCallum Gibb, Director and General Manager, went out to Australia for the purpose of inaugurating local manufacture. A site covering 23 acres of land was accordingly acquired at West Footscray, and, for the erection of a factory, a contract was placed early in June, so that the builders have lost no time in completing the work. The equipment of the works has also proceeded expeditiously; and Mr. Gibb's well thought-out plans have now taken shape in an up-to-date factory, capable of meeting local requirements for the latest and most efficient designs of gas-consuming appliances.

BRENTWOOD GAS-WORKS VISITED.

1925 Society Inspect Process of Gas Manufacture.

At the invitation of the Brentwood Gas Company about thirty members of the 1925 Society visited the Brentwood Gas-Works. Mr. W. S. Venner, Engineer and General Manager, conducted the visitors, among whom were several ladies, over the plant; and it was chiefly owing to his lucid explanation of the various processes that such an enjoyable afternoon was spent.

At the commencement of the inspection, the visitors were welcomed by Mr. C. EDGAR LEWIS, Vice-Chairman of the Board of Directors, who said they were there on the invitation of the Company. Col. F. Landon, Chairman of Directors, very much regretted that he was unable to be present.

Following the tour of inspection, the visitors were entertained at tea by the Company.

Mr. C. E. RANDELL, President of the 1925 Society, proposed a hearty vote of thanks to the Brentwood Gas Company, coupled with the names of Mr. Lewis and Mr. Venner, for the excellent entertainment and hospitality. He remarked that they had all learnt something about the gas industry.

Mr. G. H. BARNHAM, Vice-President of the Society, who seconded the vote, deplored the lack of national interest in industry generally.

Mr. LEWIS, replying on behalf of the Gas Company, remarked on the difference in condition of the works when he first came on the Board, and the high standard maintained now, and paid a glowing tribute to the work of Mr. Venner. Referring to the general strike, he said it was due to Mr. Venner and his loyal colleagues that Brentwood was then supplied with gas.

Mr. VENNER, also replying, said it had given him much pleasure to show them the works. The gas industry could go a long way towards solving the great social problem of fuel supply. At Brentwood they had embarked on a new venture in installing a coke-cutting machine. They proposed to sell the coke in three different grades, and, for convenience, in large paper bags.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

Application to Acquire the Tynemouth Gas Company.

An application by the Newcastle-upon-Tyne and Gateshead Gas Company for an Order under section 10 of the Gas Regulation Act, authorizing them to acquire the undertaking of the Tynemouth Gas Company upon agreed terms, was the subject of an Inquiry by Mr. J. F. RONCA (Director of Gas Administration) at the offices of the Board of Trade which commenced on Friday, Dec. 2. The existing area of the Newcastle and Gateshead Company comprises some 166 sq. miles, and the area of the Tynemouth Company comprises about 20 sq. miles. The two areas are contiguous, the area of the Tynemouth Company being situated between that of the Newcastle Company and the sea. The only opposition came from the Tynemouth Corporation, whose main objection was to a proposal that the amalgamated Company should be empowered permanently to charge differential prices in the present area of the Tynemouth Company. The Newcastle Company were represented by Mr. W. E. TYLDESLEY JONES, K.C., and Mr. H. ROYSTON ASKEW. The Tynemouth Corporation were represented by Mr. ROWAND HARKER, K.C.

Mr. TYLDESLEY JONES, opening the case for the Company, said that the terms of the proposed transfer had been agreed between the two Companies and approved by the shareholders. The area of supply of the Newcastle Company included the City of Newcastle, the Borough of Gateshead, and a large area on either side of the Tyne. The area of the Tynemouth Company included the Borough of Tynemouth, and the urban districts of Whitley and Monkseaton, Seaton Delaval, and Earsdon.

After tracing the history of the two undertakings, Counsel said that the existing maximum price of the Newcastle and Gateshead Company was 12·4d. per therm in Newcastle and Gateshead, and 14d. per therm in the remainder of the area. The maximum dividend on the ordinary capital was 3½ p.ct., subject to an increase of 2s. 6d. per £100 in respect of every 0·2d. per therm by which the price charged in Newcastle and Gateshead was below 11d. per therm. The Company were under a statutory obligation to grant discounts for prompt payment to the extent of 10 p.ct. to consumers whose consumption did not exceed 2000 therms in any quarter, and 15 p.ct. if the consumption exceeded 2000 therms, and might also grant a further discount of 10 p.ct. to consumers of more than 2000 therms per quarter outside the City of Newcastle and the Borough of Gateshead, if they thought fit. In 1924 the Newcastle and Gateshead Company obtained powers to amalgamate with their own undertaking the undertakings of the Walker and Wallsend Union Gas Company and the Chester-le-Street Gas Company. Provision was then made for the charging of a differential rate in the Walker and Wallsend area of 0·8d. per therm for a period of five years, and in the Chester-le-Street area a differential rate of 2·6d. per therm for five years and 2·4d. per therm thereafter.

The Tynemouth Company had a maximum price of 12·6d. per therm in the Borough of Tynemouth and the Urban District of Whitley and Monkseaton, with a differential of 1·2d. per therm in Earsdon and 2·4d. per therm in Seaton Delaval. The maximum dividend was 5 p.ct. on ordinary capital issued before the Company's 1924 Order, and 6½ p.ct. on capital issued subsequently. No capital had in fact been issued since the 1924 Order, so that the maximum dividend on all capital issued was 5 p.ct. The Tynemouth Company were under statutory obligation to allow discounts, depending upon consumption.

The date of transfer was stated in the Order to be "the first day of January, April, July, or October as shall first occur after the date of the Order." It was proposed, said Counsel, to give £125 of 4 p.ct. preference stock of the Newcastle Company for every £100 of 5 p.ct. ordinary stock in the Tynemouth Company, and every holder of 4 p.ct. preference stock of the Tynemouth Company would receive an equivalent amount of 4 p.ct. preference stock of the Newcastle Company. Thus, the shareholders of the Tynemouth Company would receive a stock which would yield the same income as that which they would give up; and, inasmuch as the holders of ordinary stock in the Tynemouth Company would receive in exchange a preference stock, it might be said that they would get perhaps a slightly better security, though the charge on the undertaking would be no greater. The retiring Directors and the Secretary of the Tynemouth Company were to receive compensation, as agreed upon, or, failing agreement, as determined by an arbitrator. The Newcastle Company were to continue to pay pensions granted by the Tynemouth Company.

With regard to prices, Counsel said it was proposed that in the Newcastle Company's existing area the maximum prices should remain unaffected—*i.e.*, 12·4d. per therm in Newcastle and Gateshead, and 14d. per therm in the remainder of the area (apart from the provisions already referred to with regard to the Walker and Wallsend and Chester-le-Street areas). It was also proposed that after the transfer the amalgamated Company should be allowed to charge an additional 1·2d. per therm, before deducting discount, in the Borough of Tynemouth and the Urban District of Whitley and Monkseaton for three years, and thereafter the differential was to be reduced to 1d. per therm, before deducting discount, above the price charged in the City of Newcastle. It was pointed out that the deduction of the discount would have the effect of reducing the differential of 1d. to 0·89d. per therm. The proposed differential in the Urban District of Earsdon was 1·2d. per therm, and in Seaton Delaval 2·4d. per therm, before deducting discounts, above the price charged in Tynemouth and Whitley and Monkseaton. Discounts and meter rents were to be allowed and charged in the Tynemouth Company's area on the same scale as were in force in the City of Newcastle other than that part which was formerly the township of Walker—Walker having their own special provisions at the present time.

The existing declared calorific values—*i.e.*, 500 B.Th.U. in the Newcastle District, and 470 B.Th.U. in the Tynemouth District—were to be continued.

The view of the Newcastle Company, said Counsel, was that, if the two Companies remained separate, the Tynemouth Company would never supply gas so cheaply as the Newcastle Company, for certain physical and economic reasons. It was common ground that as the result of amalgamation, economies would be effected, both visible and invisible. Amalgamations, however, could not be justified, even though they would lead to economies, if the consumers in the larger and more economical area would, as a result, have to pay more for their gas than they otherwise would do in order that the consumers in the smaller area should benefit. Therefore, the Newcastle Company meant to charge a differential price in the Tynemouth area so far as it was reasonable and proper to do so. The present gross prices charged in the City of Newcastle and in the Borough of Tynemouth were 8·6d. per therm and 10d. per therm respectively—a difference of 1·4d. Deducting the discounts—and for this purpose he had taken the average discounts allowed in 1926 in each case—the comparative net prices were 7·645d. and 9·543d. per therm respectively, so that the difference was 1·898d. The average discount in the case of the Newcastle Company's area in 1926 was 11·11 p.ct., whereas in the Tynemouth Company's area it was 4·57 p.ct. The effect of the amalgamation would be to reduce the price of gas in the Borough of Tynemouth immediately. The gross price in Newcastle being 8·6d. per therm, the maximum price that could be charged in Tynemouth, having in view the proposed differential, would be 9·8d. for the first three years, and 9·6d. thereafter, as compared with the present price of 10d. Thus, the immediate reduction in gross price would be 0·2d. per therm, but the Tynemouth consumers would also benefit by the scale of discounts which would be applied by the amalgamated Company, so that the actual price in Tynemouth would be reduced by more than 0·2d. per therm. Further, the Tynemouth consumers would also benefit, with the Newcastle consumers, by the economies which would result from the amalgamation. The Newcastle Company objected to the insertion of a clause providing for the termination of the differential at a fixed date, or giving the Board of Trade or other authority the power to terminate it in the future. If the proposed differential represented fairly the difference which must always exist between the costs of manufacture of the two Companies as separate concerns, then it was proper that that differential should be sanctioned.

With regard to the effect of the proposed differential, it was pointed out by the Corporation that, whereas in the Borough of Tynemouth and the Urban District of Whitley and Monkseaton the maximum price was at present 12·6d. per therm, the maximum price would be raised, as the result of the amalgamation, to 13·6d. for three years, and 13·4d. thereafter. Counsel agreed that, inasmuch as the present maximum price in Newcastle was 12·4d., and it was proposed to retain that maximum, the maximum price in Tynemouth and Whitley and Monkseaton would be increased as stated; but the Newcastle Company were considering actual prices. However, he agreed that the Newcastle Company should not be allowed to charge a higher price in the Tynemouth Company's area than that which could now be charged by the Tynemouth Company, and they would be willing to provide that they must not charge more than 12·6d. in Tynemouth and Whitley and Monkseaton, but that maximum price must be subject to revision under the Gas Regulation Act, just as the present maximum prices of the Tynemouth Company and the Newcastle Company were subject to revision.

Mr. HARKER (for the Corporation) pointed out that the maximum price of 12·4d. in Newcastle was a revised price, whereas the 12·6d. applying to Tynemouth was not a revised price, so that it might be revised if an application for revision were made.

Mr. TYLDESLEY JONES said that the Tynemouth Company were before the Board of Trade in 1924. He believed it was true that there was no revision of the maximum price at that time; but if there had been any reasonable prospect of revising it, he did not think it would have been overlooked.

Discussing the proposal for a permanent differential charge, Counsel pointed out that there were innumerable precedents for it; indeed, there were permanent differentials applying throughout this district. There was a permanent differential as between Newcastle and Gateshead, on the one hand, and the remainder of the Newcastle Company's area on the other; there was another as between Tynemouth and Whitley and Monkseaton, on the one hand, and the remainder of the Tynemouth Company's area.

The Tynemouth Corporation were also a little apprehensive that the employees of the Tynemouth Company might not be fairly treated after the amalgamation; but the Newcastle Company had given written assurances in this respect. Copies were handed to Mr. Ronca and to Mr. Harker.

Mr. *J. E. Cowen*, J.P. (Chairman of the Newcastle Company), gave evidence. The population in the Newcastle Company's area, he said, was about 690,000, and in the Tynemouth Company's area it was about 105,000. The consumers numbered 153,000 and 26,000 respectively. The total manufacturing capacity of the Newcastle Company was 24¾ million c.ft. per day. At the Redheugh Works the capacity was about 11¼ millions of coal gas and 5 millions of water gas. At Elswick, where there were vertical retorts, the capacity was about 6 millions; and at the Howdon Works there were horizontal retorts capable of an output of about 2½ millions per day. The output of the coal gas plant at the Tynemouth Works was about 2¾ millions, and of the carburetted water gas plant, 2 millions, making a total of 4¾ millions. The power to charge differential prices, as set out in the Order, in the Tynemouth district was an important condition of the amalgamation; and since the commencement of the negotiations between the two Companies it had been mentioned as being necessary. The Newcastle Company were satisfied, on the figures of costs, that, after allowing for the money expended by both Companies in the improvement of their undertakings, and after making all necessary adjustments, there was a difference in costs of something like £12,000 a year; and they considered that the savings resulting from the amalgamation as such would not be anything like that amount. The Newcastle Company considered that a penny per therm represented fairly the permanent disability

of Tynemouth as compared with Newcastle; and if that differential were allowed, the consumers in the two districts would share equally in the improvements effected.

Asked, in cross-examination, if the Directors would object to the insertion of a clause for the purpose of giving the Board of Trade an opportunity of re-considering the differential charge, after a reasonable time, witness said they would object, because they did not consider that the actual cost of supplying gas in the Tynemouth area could be ascertained accurately after the amalgamation. The two undertakings would be connected-up at various points, and gas made in Newcastle would be supplied in Tynemouth. No doubt the costs in respect of the gas manufacture at the Tynemouth Works and supplied in the Tynemouth district could be ascertained; but in parts of the year gas would have to be supplied from Newcastle as well.

Reference was then made to the fact that the Earsdon Urban District Council (which is within the area of the present Tynemouth Company) had lodged objections to the present Order, but had withdrawn as the result of negotiations with the Newcastle Company. It was proposed in the Order that the amalgamated Company should have power to charge 1·2d. per therm more in Earsdon than in the Borough of Tynemouth (as the Tynemouth Company have power to do now). Cross-examination elicited that it had been agreed to reduce the differential of 1·2d. in Earsdon as consumption increased. If the consumption exceeded 25,000 therms, the differential would be reduced by 0·2d.; a further 0·2d. would be deducted if consumption exceeded 75,000 therms; and there were to be further reductions of 0·2d. per therm in respect of subsequent increases of 50,000 therms. Counsel pointed out that, inasmuch as the present consumption in Earsdon is a little under 150,000 therms, the price charged as from the date of amalgamation would be only 0·6d. per therm above the price charged in Tynemouth, and the consumption in Earsdon might eventually reach a figure at which the differential would disappear. Mr. Cowen agreed that the Newcastle Company had previously accepted the principle of a declining differential for the outlying areas, based upon consumption, because similar arrangements were made in most of the outlying areas of the Company. A similar arrangement had been made with Seaton Delaval, though in that case the differential started at a different figure from that applying to Earsdon.

In view of witness's statement that the Company would not have made such arrangements unless they were satisfied that they were not doing anything to prejudice consumers in the Newcastle area, Counsel wanted to know how the Company had been able to look ahead in the way they had done, and had considered themselves justified in agreeing to a disappearing differential in those cases and why similar arrangements were not made in Tynemouth. Witness replied that unless the consumption was enormously increased in the districts concerned the differential charges would not disappear. The Company did not think there was very much prospect of increased consumption in the Borough of Tynemouth. It was suggested by Counsel that if there were an increased consumption in the Tynemouth area, the Newcastle consumers would benefit. Witness replied that they would not benefit to a greater extent than the Tynemouth consumers.

With regard to compensation, witness said it had been decided to pay a lump sum of £6000 to the Board of the Tynemouth Company. There were four Directors concerned. The present annual fee of the Tynemouth Board of Directors was 1000 guineas, free of tax. It was proposed to pay to the retiring Secretary of the Tynemouth Company a lump sum of £2000 and a pension of £250 a year. He was a man about 77 years of age. There were two Auditors to whom it was proposed to pay 100 guineas.

Replying to further questions, witness said that the Newcastle Company had more spare plant than the Tynemouth Company. The maximum capacity of the Company's works was 24¾ million c.ft. per day. The maximum day's demand on record occurred in 1918, the demand on that day being 21·3 millions, but the maximum daily demand in 1926 was 19·8 millions. It was the policy of the Company to reduce the make of water gas, because it was more expensive than coal gas. As the result of the amalgamation they would expect to supply coke oven gas in both Tynemouth and Newcastle, and to keep the water gas plants in both areas as stand-by. If the consumption in the Tynemouth area increased, and the Tynemouth Company remained separate, they would have to use more water gas plant.

There was some discussion as to whether the amalgamated Company would continue to manufacture at the Tynemouth Works. Witness said that at present it was not the intention to close those works, but it would obviously be in the interests of the consumers to close them if a bulk supply could be obtained at a price considerably below the cost of manufacture at Tynemouth. It was possible that if the two Companies remained separate, the Newcastle Company would be able to provide a bulk supply to Tynemouth.

Mr. HARKER asked if the position was that, unless the Board of Trade gave power to charge 1d. per therm differential permanently in the Tynemouth district, the Newcastle Company would not go on with the present Order.

Witness replied that so far as his Directors could see at present, unless they obtained power to charge a differential price, they would not go on with it.

Mr. HARPER: Must the differential be a permanent one?

Witness: Yes.

There was some discussion as to the possibility of dismissal of workmen from the Tynemouth undertaking, and Counsel said the Tynemouth Corporation feared that this might occur if the Company ceased to manufacture at the Tynemouth Works. Witness pointed out, however, that after the amalgamation there would probably be more men employed on distribution at Tynemouth than formerly. For instance, the amalgamated Company would give hire-purchase and maintenance facilities, which would result in greater employment, so that on the whole the number of men employed would not be materially less.

Questioned with regard to the supply of coke oven gas, witness said the Company had agreed with the Consett Steel and Iron Company to take 5 million c.ft. per day; the Gas Company being given a certain time in which to work up to that quantity. The Consett Company expected to be able to supply more if the Gas Company wanted it, probably up to 10 million c.ft. per day. Whether or not the Gas Company would take more than 5 million c.ft. per day would depend upon results.

In re-examination, it was pointed out that, if the two Companies remained separate, and Tynemouth obtained a bulk supply from Newcastle, it was probable that the number of men displaced at Tynemouth would be greater than would be the case if the two Companies amalgamated, because the Tynemouth Company employed relatively fewer men on distribution than did the Newcastle Company. Further, the latter Company would expect a profit from the bulk supply, which profit would benefit the Newcastle consumers.

Mr. *T. P. Ridley* (Secretary and General Manager of the Newcastle Company) gave evidence, and handed in more than twenty tables giving details of the costs, &c., of the two undertakings, and making comparisons between the two, to justify the differential charges proposed. For the purpose of comparing the costs of the two undertakings, he took the averages of the three years, 1923-25—1926 being an abnormal year. The net cost of coal was 0·612d. per therm higher in the case of the Tynemouth Company than in the case of the Newcastle Company. At Tynemouth the yield of therms per ton of coal was less, and the cost of carriage of coal and gas oil to Tynemouth was higher. There was less yield of coke and breeze, rail and shipping charges for export coke were higher, the cost of putting coke on rail was higher, and generally a lower price was realized for coke and breeze. The yield of tar per ton of coal was less. The Newcastle Company bought tar from the Tynemouth Company. The Newcastle Company extracted benzole at two of their works, but the Tynemouth Company had not the plant. The yield of sulphate of ammonia was less at Tynemouth, and the cost of making it was higher. He saw no reason why the difference in net cost of coal should be reduced in the future without the expenditure of a good deal of money.

Details were given of other items of cost, and in some cases it was shown that the difference was in favour of Tynemouth, due to some extent to difference in allocation of costs. Witness concluded, however, that the true permanent difference in costs as between the two Companies, as separate entities, after making all necessary adjustments was 1·075d. per therm, equivalent to £11,910 per annum. The differential of 1d. per therm—which, when adjusted in respect of discounts, amounted to only 0·898d.—would account for £9855, leaving a balance of £2055 per annum to be accounted for by savings.

The visible savings resulting from the amalgamation were then dealt with. The amalgamated Company, it was stated, would be able to buy oil at ¼d. per gallon less than the price paid by the Tynemouth Company, and this would result in a saving of £50 per annum. The saving in management costs (remuneration to Directors, Auditors, and Secretary) would amount to £258, making a total saving of £2508. There were other charges, however, to be set against this. Compensation and legal costs in connection with the amalgamation would be £10,000. On the other hand, the extra differential of 0·2d. per therm over and above the 1d. per therm in the Tynemouth area in the first three years would produce £6100, leaving a balance of £3900; the annual charge on this, at 5½ p.ct., being £214. The annual contribution by the amalgamated Company to the pension fund in respect of the Tynemouth employees (the Directors having undertaken to give the Tynemouth employees the opportunity to join the existing Newcastle pension scheme) would amount to £1513, which, added to the £214, totalled £1717. This latter amount, deducted from the £2598, reduced the visible savings to £871. This sum was deducted from the £2055 mentioned above, leaving a balance of £1184 to be covered by other savings.

Summarizing the relative positions of the two undertakings, witness said that both had spent large sums of money in renewals and extensions. The Tynemouth Company, however, if they remained separate, must spend further large sums for this purpose in the future, whereas the Newcastle Company need not spend so much in future as in the past, in view of the contract for the supply of coke oven gas. The permanent differences in costs as between the two undertakings were due largely to their geographical positions; and the Newcastle Company's coke oven gas contract was a further factor.

The saving to consumers in the Tynemouth Company's area during the first three years after the amalgamation, by reason of the reduction in the price of gas, would be £5101 per annum, and after that it would be increased.

At this point the proceedings were adjourned until the following day; and it was agreed that Mr. Arthur Valon (of Messrs. W. A. Valon & Son, Westminster), who was advising the Tynemouth Corporation, should study the figures and ask Mr. Ridley for any explanations he might require, in order to avoid unnecessary cross-examination. A few alterations to the figures resulted.

Saturday, Dec. 3.

In his cross-examination of Mr. *Ridley*, Mr. HARKER pointed out that in the last few years the net coal costs of the Tynemouth Company had been gradually decreasing, and the difference between the net coal costs of the two Companies was lessening. If Mr. Ridley had taken the year 1925 as the basis of comparison, as he suggested should have been done, instead of the average of three years, the difference between the net coal costs of the two Companies would have been 0·449d., instead of 0·612d. per therm. A similar criticism applied in respect of repairs. Again, in 1923 the Tynemouth Company had paid back-dividends; whereas they did not do so in 1924 and 1925. The difference between the total costs per therm of the two Companies had been decreasing during the three years dealt with. So that the position of the Tynemouth Company in 1925 was less unfavourable than Mr. Ridley's figures indicated.

Witness agreed.

In the course of further discussion, Counsel said it appeared that the total visible savings would be £871 a year; but it appeared also that the losses would be greater than this amount. The net result of the amalgamation would be that the Newcastle Company would

have to effect further savings, over and above the £871, in order to prevent loss.

Mr. Frank P. Tarratt (Chief Engineer of the Newcastle Company) agreed with Mr. Ridley that the Tynemouth Company as a separate entity would never be able to manufacture gas as cheaply as the Newcastle Company. In his view the difference in costs as between the two undertakings would tend to increase rather than decrease. If the two Companies were amalgamated, and the mains inter-connected, some of the capital expenditure which would otherwise be necessary in Tynemouth could be saved. From the engineering point of view, the amalgamation would be advantageous to the consumers.

Cross-examining, Mr. HARKER pointed out that at present the Tynemouth Company had a considerable reserve of plant lying idle; and he asked witness if he anticipated an increased consumption in the Tynemouth district.

Witness replied that there was a reasonable prospect of it.

This closed the Newcastle Company's case.

Mr. HARKER, on behalf of the Tynemouth Corporation, said that they represented 16,000 present consumers, and in addition a very substantial number of potential ones. They objected to the Order in its entirety so long as there remained in it a clause giving a permanent differential price. They did not object to the Company having some differential for a period, because they realized that the fruits of amalgamation—which he hoped would grow a little more than the £871 shown by Mr. Ridley's table—could not be gathered at once. Mr. Cowen, in the course of cross-examination, had said that the re-organization consequent upon amalgamation would occupy a period of something like five years. The Corporation would be prepared to accept a provision that for a period of three, four, or five years (whichever the Board of Trade considered would be fair and proper) the Company should have power to charge a declining differential. After that the re-organization should be sufficiently complete to enable them to do without a differential altogether. It had been said that there were precedents for permanent differentials; but there were also precedents for differentials which would cease in a given time. One of the important advantages of settling this question of a differential once and for all, from the point of view of the Corporation, was that it would save them the expense of further proceedings in the future. The Newcastle Company themselves had already accepted the principle of a declining differential in other districts. If, however, the Board of Trade considered that, even with the information before them, the time was not yet ripe for them to arrive at a final conclusion in the matter, he suggested as an alternative the insertion of a clause in the present Order placing upon the Company the obligation to make an application to the Board of Trade for a Special Order within a certain period, so that the question of the differential could be re-investigated, and that the Tynemouth Corporation should have an opportunity of appearing. A further alternative was the insertion of a clause, with suitable modifications, on the lines of that in the Norwich Gas Order of this year. That clause gave the Norwich Corporation power to apply to the Board of Trade in the future to ensure the maintenance of a sufficient differential charge in the outlying districts, in order that the consumers in Norwich should be protected. It would have to be modified in the present case, however, to give the Tynemouth Corporation power to apply for a reduction of the differential charge in Tynemouth.

Mr. RONCA pointed out that in the Norwich case there were special circumstances, in that the Norwich Corporation appointed Gas Company Auditors, so that they had access to the Company's accounts, and did not need to be given special facilities.

Mr. HARKER said it was because he had appreciated the disadvantages of the Tynemouth Corporation in not having access to the books of the Newcastle Company that he asked for a clause on the lines of that inserted in the South Metropolitan Company's Act. This would place upon the Company the obligation to commence proceedings within a definite time; and they would then have to put before the Board of Trade an affirmative case in support of their claim to continue the differential. The point the Board of Trade had to consider was not the present difference in cost of supplying the two areas, but the differences in cost after the amalgamation. It was on that principle that differentials had always been either granted or refused. It had been agreed that there were likely to be substantial increases of consumption in the Tynemouth area. Those increases, in an area at present governed by a Company whose capital in relation to output was comparatively small, were surely going to affect the interests of the consumers over the whole of the area. Assuming he was right in saying that the differential should be permitted only on figures showing what would be the state of affairs after the amalgamation, the Director had very little information—indeed, he was tempted to submit that there was no material at all before him, with the exception of Mr. Ridley's £871—which would enable one to form any opinion as to the difference in cost of supplying the Newcastle and the Tynemouth areas after the amalgamation.

Mr. *Arthur Valon* (Messrs. W. A. Valon & Son, Civil Engineers, Westminster), as adviser to the Tynemouth Corporation, gave evidence on their behalf. His view was that the only fair ground on which a differential charge could be permitted was the difference in the cost of supplying the two areas after amalgamation, and not the difference in cost as between the two Companies as separate entities. He was of opinion that the economies resulting from amalgamation would be very substantial; and those economies should inure to the benefit of the consumers in both Newcastle and Tynemouth. It was quite impossible to say that for all time the cost of supply in the Tynemouth area would be greater than in the Newcastle area, if the Companies remained separate. The only ground he had heard for that suggestion was that it cost a little more to convey coal to Tynemouth than to Newcastle; but that might be balanced by other factors. The size of an undertaking was a factor to be considered; but there was an optimum size for a gas-works, and it did not follow that a works always became more economical as it became larger. There were plenty of gas undertakings smaller than Tynemouth selling gas at a price very much lower than that of the Newcastle Company, and there was nothing to show that the Tynemouth Company could not in time supply as cheaply as Newcastle, if the undertaking remained separate. While he agreed with Mr. Ridley's figures, he objected to the use of the figures for the years 1923-24-25 as a basis for the Company's case, because one could not tell, from the working of a company five years ago, what the normal working of that company at present would be. The proper figures to use as a basis were those for the last normal year, which was 1925, inasmuch as 1926 was abnormal. The difference in costs as between the two Companies had decreased gradually during the last three years.

Witness put forward figures of costs of the two undertakings based on the working results of 1925, to which he made an adjustment in order to account for the difference between the average price of gas and the price to the ordinary consumer, because, he said, the differential price was a differential between the prices charged to ordinary consumers in the two areas, and not between the average prices charged. His figures showed that the average costs of supply were 7·809d. per therm in Newcastle and 9·013d. in Tynemouth. The differences between the average prices and the actual prices to ordinary consumers were 0·789d. and 0·381d. respectively; and by adding these to his previous figures, he obtained costs of 8·598d. per therm in Newcastle and 9·394d. in Tynemouth. The calculations of savings put forward by the Company were based on the present selling price of 10d. per therm in Tynemouth. Before the coal strike, however, the Tynemouth Company were selling at 9½d. per therm; and he had not the slightest doubt that they would have been selling at 9½d. per therm or lower at present, had it not been for the amalgamation. In the case of most companies the present cost of supply was lower than the pre-strike cost. He estimated that as the result of the amalgamation the Tynemouth undertaking would obtain increased receipts from tar; and there would be reductions in repairs and maintenance costs, and in salaries and wages. Against these economies an adjustment was made for general establishment charges; but the net result was to reduce the Tynemouth costs per therm to 7·981d. There was a further adjustment, however, to allow for the reduction of revenue in the Tynemouth area when the Newcastle Company's scale of discounts came into force there; and the result of that adjustment was to increase the cost per therm at Tynemouth to 8·563d., which compared with the Newcastle figure of 8·598d.

With regard to a differential, witness considered it would be reasonable that it should commence at 1d. per therm, declining gradually and vanishing altogether at the end of five years. The Company would have no difficulty, however, in presenting sufficient material to the Board of Trade at the end of five years to enable the matter to be re-examined, if the Board of Trade considered that course necessary. If the Board of Trade had any doubt about the five-year period, he personally would prefer a rather longer time, at the end of which the differential would definitely disappear, rather than a provision for the differential to be re-considered. The Company would still have an opportunity, of course, to ask for a revision.

Questions were put by Mr. TYLDESLEY JONES, in cross-examination, as to the extent of the advantage which would accrue to the consumers in the Tynemouth area by reduction of the price of gas as the result of the amalgamation; and he asked if Mr. Valon would agree that the immediate saving would amount to just over £5000 per annum for the first three years.

Witness said he would agree if the present economic price in Tynemouth was 10d. per therm; but there was nothing to show—indeed, there was everything to disprove—that this was the economic price. The saving in Tynemouth would be greater at the end of three years, of course, if the Newcastle price remained at the present level, and greater still if the Newcastle price was reduced; but he pointed out that in the ordinary course of events the Tynemouth price would be reduced, probably faster than the Newcastle price.

Mr. TYLDESLEY JONES said Mr. Valon was proposing that the economies to be effected at the Tynemouth works by reason of the amalgamation were to be credited to the Tynemouth district, and those that were effected at the Newcastle works by reason of the amalgamation were to be credited jointly to the Newcastle and the Tynemouth areas.

Witness disagreed. He was assuming, he pointed out, that by reason of the amalgamation the costs in Tynemouth would first come down to the level of the Newcastle costs, and then there would be a further reduction of the costs over the whole area, which reduction would be to the benefit of both areas.

Mr. TYLDESLEY JONES, summing up, said Mr. Valon's proposal was that, though the Tynemouth undertaking might be the more expensive if the two remained apart, the Tynemouth consumers should be given the benefit of all the economies at the Tynemouth works resulting from the amalgamation, and the economies made at Newcastle should be shared by the two areas. That was a preposterous suggestion. It was absolute nonsense to say that the real thing to be considered was, not the difference in costs at the present time, but the estimated difference between the costs of the two areas after amalgamation. Commenting on Mr. Harker's criticisms, he said it had never been suggested, of course, that Newcastle was not going to get anything at all out of the amalgamation; the two areas would benefit proportionately by the amalgamation if the differential were allowed. Again, the suggestion that the amount of £871 was the only economy to be effected was ridiculous, and showed that the whole basis of the Company's case had never been understood either by Mr. Harker or by Mr. Valon. There had been really no attack on the proposed differential of 1·2d. for the first three years. Discussing the suggestion that a modification of the Norwich clause should be inserted in the Order, he pointed out that the circumstances of the Norwich Order and the present Order were not parallel. The Norwich Company had been given power to charge a permanent differential in the outer districts; and the only question that had arisen was that the Norwich Corporation should have power to ask that it be increased. The Norwich Corporation had

By appointment.

ILLUSTRATION shows a new CARRON GAS MANTEL REGISTER specially adapted for modern Housing requirements. It is fitted with seven radiants, silent burner with brass inlet tap fitted with gas and air adjuster, suitable for right or left hand connection; brass knob to fret; gas fire is separate from mantel, but screwed to it; all parts are accessible from the front for cleaning or renewal without removing mantel or fire.

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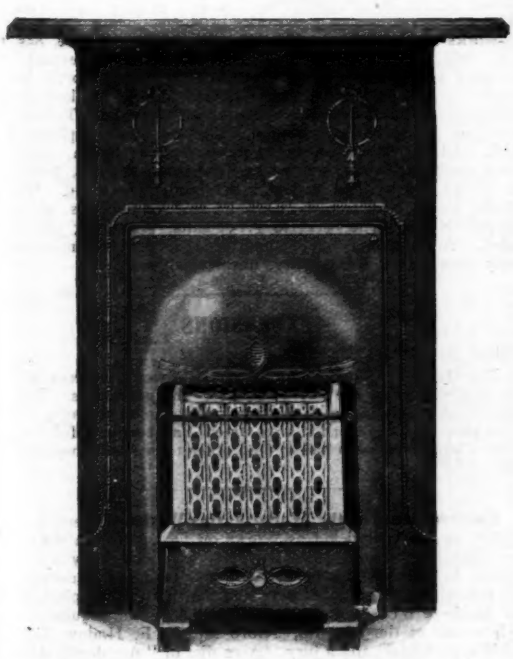

No. 1296G Gas Mantel Register Grate.

emphasized the importance of an adequate differential. The other suggestion, to insert a provision on the lines of the South Metropolitan Company's clause, seemed to be merely for the purpose of providing an opportunity of discussing the whole matter again. The two cases were not parallel, because the basic price of the South Metropolitan Company was a price applying to the whole of one undertaking; whereas the problem now under discussion was to decide upon a fair differential charge on the amalgamation of two undertakings.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDER.

Oldbury Urban District Council.

To empower the Council to utilize scheduled land for gas purposes, to purchase gas-works residuals, and to borrow money and enact such other financial provisions as may be necessary or convenient.

DECLARATION OF CALORIFIC VALUE.

Harrogate Gas Company.—In part of the district, 460 B.Th.U., as from April 1, 1928. In other parts, 500 B.Th.U. as from April 1, and 460 B.Th.U. as from July 1.

LECTURE ON WROUGHT-IRON TUBES AND FITTINGS.

Meeting at the Showrooms of the Leamington Priors Gas Company.

On Dec. 5 Mr. G. H. Willett, of Messrs. Stewarts & Lloyds, Ltd., delivered a lecture, illustrated by lantern slides, on "Wrought-Iron Tubes and Fittings," at the Central Showrooms of the Leamington Priors Gas Company, when there were present a good number of the staff and employees of the Leamington and Warwick gas undertakings.

Mr. Willett said that the first water mains to be laid in London—250 years ago—were simply the trunks of elm trees bored out to the required size, from 2 in. to 10 in. diameter. When gas was first introduced into Birmingham by Murdoch, gun barrels procured from the Napoleonic wars were used to convey the gas. These barrels were only 4 ft. long, and were tapered. The small end of one was screwed into the large end of another.

It was as late as 1824—a little over 100 years ago—that James Russell took out the original patent for making lapwelded tubes, and it was from this beginning that the present process had been evolved. It had been found that, though steel was stronger, and for high pressures more desirable, it did not stand up to the effects of corrosion so well as wrought iron. When the wrought iron arrived at the works it was in the form of long strips of predetermined lengths and widths. Two of the principal parts of a tube mill were a furnace and a drawbench.

Buttwelding was restricted to the smaller sizes, nothing over 2 in. being made commercially by this process. The strip of iron used to make a buttwelded tube had square edges—the end of the strip being tapered and slightly dished. The process consisted of heating this strip to welding heat, and then pulling it through a die known as a bell, the inside diameter of the small end of which was equal to the outside diameter of the tube to be made, while the large end was slightly larger than the width of the strip. The strips were fed through the back of the furnace electrically, and as each reached the right heat, the welder gripped the tapered end with a pair of tongs of slender proportions, and threaded a bell of the required size over the tongs, which were then attached to the travelling chain of the drawbench. The chain travelled forward, taking with it tongs, strip, and bell, until the latter reached a stop, which prevented it from moving further; the result being that the strip was pulled through the bell. It was thus formed into a soundly welded tube.

The lapwelding process was applicable to all sizes of tubes from 1½ in. to 6 ft. diameter, and for thicknesses from ⅛ in. to 1½ in. In the process of manufacture the scarfed plate was fed into a furnace, preferably a gas-fired one. From there it was drawn at a bright red heat through a turning-up die designed to form the strip into circular shape. The strip was now known as a skelp, and the process as skelping. The skelp was then led into another furnace, in which it was raised to a welding heat. The skelp passed eventually between the rolls and mandrel; and the pressure exerted between them closed the edges together and welded them. When the tube got above 12 in. it became too unwieldy in the rolls, and a modified form of lapwelding known as gas welding, or hydraulic welding, was used for tubes of that diameter and upwards.

The fittings used with screwed tubes were forged from strip of similar quality to the strip from which the tubes were made. A series of slides was shown illustrating the various fittings supplied.

In conclusion, Mr. Willett said that corrosion was combated in several ways. Galvanizing was one of them, and consisted of coating the pipes internally and externally with zinc. Another method was to coat the tubes with Dr. Angus Smith's solution. This solution must never be used as an internal coating for gas pipes. As a further protection pipes were wrapped in hessian cloth which had been soaked in the solution. Another method which had proved efficacious was to coat the tubes both externally and internally with heavy engine oil, which was allowed to flow down the tubes and drain off, leaving a film of oil as a protection.

Unventilated Bathroom Fatality.—At an inquest on the body of a widow found dead in her bath at Reigate, it was stated that the water was heated by a geyser, but that there was no ventilation in the bathroom when the door was closed. A post-mortem examination revealed that death was due to carbon monoxide poisoning.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The market has been steady during the past week, and has been assisted by the approach of the holidays, shippers being anxious to cover their commitments in good time. While there has been no pressure to buy coals, colliery turns have been steadily filling up for the rest of the year, and steams and coking coals have continued to show the improving tendency noted last week.

Reports from Continental producers of coal indicate from time to time that they, too, feel the pinch of world competition. The question is freely discussed as to how long the Polish Government will be able to subsidize its coal industry through the railway freights, and continue to enable it to hold markets which were formerly big consumers of English coal. Recent news from the Ruhr is to the effect that stocks are accumulating, and export quantities on the decrease. Such items are encouraging to a market like this, which so largely depends upon export trade.

Current quotations are 16s. to 16s. 3d. f.o.b. for Wear Special gas, and 15s. 9d. for best qualities. Seconds are 13s. 6d. to 14s. Unscreened coking is 13s. 9d. to 14s. 3d., with good inquiry continued. Durham unscreened steam for cargo or bunkers is 14s. 6d. to 15s. 6d. for best qualities, and 13s. 6d. to 13s. 9d. for seconds. Northumberland steams are better booked, and best sorts hold out for 14s. direct for best screened sorts, with second-hand holders stronger at 13s. 9d. to 13s. 10½d. Gas coke is quoted 23s. 6d. to 24s. f.o.b. for export.

YORKSHIRE AND LANCASHIRE.

One or two gas inquiries are in the market, and unless there is an alteration during the next few weeks, it may be that these requirements will be fixed at prices below those of last summer.

With many industrial contracts due to expire at the end of the year, and with the negotiations between the South and West Yorkshire coalowners prominently before the public, an effort is being made to standardize slightly increased prices for forward delivery. So far buyers are not inclined to pay advances, and it may be that many will continue to purchase in the open market.

In some quarters it is reported that slightly better business is being done in export; but the majority of collieries report no change.

There has been a rather better demand for domestic fuel during the past week, although nothing like what is usual for the time of the year. Summer prices still prevail in the majority of cases.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 16s. 6d. to 16s. 9d.; screened gas coal, 16s. to 17s.; washed trebles, 16s. 9d. to 17s. 3d.; washed doubles, 16s. 3d. to 16s. 6d.; washed singles, 15s. 6d. to 16s.; washed smalls, 11s. 9d. to 12s. 3d.; rough slack, 8s. 6d. to 8s. 9d.; smithy peas, 17s. to 18s. per ton. West Yorkshire—Hartley's (f.o.b. Goole), 14s. 6d. to 16s.; screened gas coal, 15s. to 16s.; washed trebles, 16s. 9d. to 17s. 3d.; washed doubles, 15s. 6d. to 15s. 9d.; washed singles, 15s. to 15s. 6d.; washed smalls, 11s. 9d. to 12s. 3d.; unwashed trebles, 15s. 9d. to 16s.; unwashed doubles, 11s. 6d. to 12s.; rough slack, 9s. to 9s. 3d.; coking smalls, 9s. to 9s. 3d. per ton. Derbyshire and Nottinghamshire—Top hards, 16s. to 17s. 6d.; washed doubles, 15s. 9d. to 16s. 3d.; washed singles, 15s. 3d. to 15s. 9d.; washed smalls, 11s. to 12s.; unwashed doubles, 12s. to 12s. 6d.; rough slack, 8s. 6d. to 9s. per ton. Yorkshire, Derbyshire, Nottinghamshire—Screened steam coal, 14s. 6d. to 15s. 6d.; gas coke, 25s. to 25s. 6d.; furnace coke, 16s. 6d. to 17s. 6d. per ton.

Average prices at Manchester: Lancashire best house, 31s. to 32s.; good seconds, 27s. to 28s.; common, 19s. to 21s.; kitchen, 22s. to 24s.; Yorkshire selected house, 31s. to 34s.; best house, 27s. to 28s.; cobbles, 18s. to 20s.; washed doubles, 12s. 6d. to 14s.; washed singles, 11s. 6d. to 12s. into wagons at pit.

MIDLANDS.

Seasonal developments in the house coal trade are scarcely appreciable outside the lower grades. Cobbles are in better demand, while hand-picked coal is receiving little attention; hence the difference in cost tends to diminish. Merchants are urging their middle-class customers to take precautions against eventualities. In a vast number of cases, however, stocks laid in during the summer are unexhausted, and with the weather open and a market over-supplied little attention is being paid to this counsel.

Collieries have no opportunity of stiffening their prices owing to accumulations in the distributive channels which are still waiting to be cleared. The railways are now diverting a considerable proportion of their resources to Christmas traffic, and a change of weather would quickly reverse the situation so far as the trade in household fuel is concerned.

The market for industrials remains very sluggish. Brickmakers and some other consumers are ordering extra supplies for delivery during the holiday quietude, but the general body of demand promises no expansion yet awhile. There is not now such an output of slacks as to force sales at any price obtainable, but easy market conditions prevail. Nutty slacks can be had in plenty at 5s. 6d. to 8s. 6d. at the pit head. Beans show rather more strength at 7s. to 14s. "D. S." nuts range from 8s. to 15s. Leicestershire steams can be bought at 11s. In other districts they range up to 13s. If there is any increase in output it is not appreciable.

New Joint Stock Companies.—Among companies recently registered are: Continuous Coal Carbonization, with a capital of £100; Discon, manufacturers of a miniature incandescent gas light, with a capital of £2500; Harris, Williams (Manufacturers), gas appliance makers, with a capital of £1000; H.H. Gas Plant Syndicate, with a capital of £1000; and the Wardle Gas Mantle Fabric Company, with a capital of £518.

REDHILL GAS COMPANY'S CO-PARTNERSHIP.

It was shown at the annual meeting of co-partners in the Redhill Gas Company that, in spite of the effects of the coal stoppage, which covered five months of the year, nearly £1200 had been credited to the co-partnership funds for bonus and interest. This amount was practically the same as that for the previous year. Mr. G. R. Hunt (Chairman of the Management) presided; and he was supported by Mr. W. H. Bennett (Vice-Chairman), Messrs. H. Stacey and R. H. Mew (Directors of the Company), Mr. Ernest Scears (Engineer), and Mr. Horace Long (Secretary). Following the meeting, the Directors entertained the co-partners and their wives and friends to a concert.

The Committee, in their fourteenth annual report, stated that the number of co-partners on the date of closing the accounts was 141. The amount of investments and savings during the twelve months again showed satisfactory progress. Co-partners were reminded that all were welcome to avail themselves of the advantage of depositing their savings with the Trustees. The savings account amounted to the creditable figure of £418. The sum invested by co-partners during the year in the capital of the Company was £1081. The capital stock held by co-partners on June 30 last amounted to £6520.

The Chairman said that never greater than to-day had been the need for complete understanding between capital and labour—the employer and the worker—how best to work the undertaking they had in hand, to secure and increase the market for what they produced for sale. The employee who thought the only advantage arising out of co-partnership was the bonus he received, sadly misunderstood the whole basis and object of the scheme.

Mr. Bennett pointed out that nearly fifty companies had adopted co-partnership; and these undertakings produced some 60 p.ct. of the whole of the gas made by companies (not corporations) throughout the kingdom. These were figures of which the gas industry might well be proud.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Dec.* 12.

Tar products continue steady, and without material change. Current values are as follows:

Pitch, 90s. per ton f.o.b. makers' works; creosote, 9d. per gallon; pure benzole, 1s. 5d. to 1s. 6d. per gallon; pure toluole, about 1s. 10d. to 1s. 11d. per gallon; 95/160 solvent naphtha, 1s. 3d. per gallon; and pyridine, 6s. to 6s. 6d. per gallon.

Tar Products in the Provinces.

Dec. 12.

Markets for tar products are without alteration.

Pitch is still steady. Manufacturers on this side appear to be in a very easy position, while at present Continental manufacturers are refraining from purchasing.

Creosote continues very firm, with a good demand for both prompt and forward delivery.

There is little or no change in water-white products, which remain quiet owing to the competition of petroleum products.

Refined naphthalene is still firm, and with a fair amount of inquiry for both prompt and forward delivery.

Crude carbolic acid remains steady, and cresylic acid is still in demand for the better qualities.

The average prices of gas-works products during the week were: Gas-works tar, 61s. 6d. to 66s. 6d. Pitch—East Coast, 85s. to 86s. f.o.b. West Coast: Manchester, 80s. to 81s.; Liverpool, 83s. to 83s. 6d.; Clyde, 84s. to 85s. Benzole, 90 p.ct., North, 1s. 1d. to 1s. 2d.; crude, 65 p.ct. at 120° C., 10d. to 10½d., naked at makers' works; 50/90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluole, naked, North, 1s. 4d. to 1s. 5d. nominal. Coal-tar crude naphtha, in bulk, North, 7½d. to 8d. Solvent naphtha, naked, North, 9½d. to 10d. Heavy naphtha, North, 10d. to 1s. Creosote, in bulk, North, liquid, 7½d. to 7⅝d.; salty, 7⅜d. to 7½d.; Scotland, 7½d. to 7⅝d. Heavy oils, in bulk, North, 8¾d. to 9½d. Carbolic acid, 60 p.ct., 2s. 4d. to 2s. 5d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

EXTENSIONS.

Vertical Retorts for Hereford.

The Hereford Town Council have approved a scheme involving a sum of £38,000 for the improvement of the gas-works. The scheme refers to the installation of vertical retorts, coal storage, and purification plant. The report, it was stated, had been carefully considered by the Committee, who had visited other towns and inspected similar plant.

Fatal Accident at the Warwick Gas-Works.—There was a fatal accident at the Warwick Gas-Works on Dec. 7, when the yard foreman, Mr. John Branthwaite Rodgers, was struck by a truck. He received injuries to the head, and was rendered unconscious. He was taken in the ambulance to the Warneford Hospital, where he died at three o'clock the same afternoon. The inquest took place on Dec. 10, at the hospital, before Mr. E. F. Hadow (Coroner for Mid-Warwickshire) and a jury. A verdict of "Accidental death" was returned; no blame being attached to anyone. Mr. Rodgers, who was 72 years of age, had been yard foreman at the gas-works for 35 years, and during that time he saw many changes and developments there. In his earlier days he was a ship engineer, and he had been in many countries.

STOCK MARKET REPORT.

QUITE a cheerful tone prevailed on the Stock Exchange last week. The new account opened with a burst; and though transactions eased off towards the close, the average business done over the whole week was exceptionally good for the time of the year. A more hopeful view taken of the gold situation also assisted business, and investment stocks made further progress. The Port of London issue was a pronounced success, although not available for trustees; and the Australian, South African, Victorian, and Kenya recent issues were much in demand.

Industrial specialities were remarkably active, especially Triplex Glass, Marconi, Brazilian Tractions, Gramophones, and Artificial Silks.

Gas was not neglected; lack of sellers being the only reason why there were not more transactions recorded. Oriental stock made a spectacular jump of 6 points to 105-110, for which may be attributed the results announced at the recent general meeting, particularly the improvement in the capital position. The 10 p.ct. f.o.t. dividend paid on the £1 shares of the Colombo Company also justifies the rise of 3s. to 31s.-33s. Of the English companies Brighton and Hove were again supported, and are now quoted 109-112 on the 6 p.ct. stock, and 98-101 on the 5 p.ct. stock. An interim dividend of 7½ p.ct. per annum has been declared on the ordinary stock of the Plymouth and Stonehouse Company.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Dec. 9.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Sept. 8	5	5	Aldershot 5 p.c. max. C.	68—73	..	70—70½
822,992	,,	,,	4	4	Do. 4 p.c. Pref.	67—70	..	69
1,551,868	,,	Sept. 29	7	7	Alliance & Dublin Ord.	90—94	..	91½—93 7/16
374,000	,,	July 14	4	4	Do. 4 p.c. Deb.	64—67	..	65½
522,654	,,	Aug. 25	—	7	Barnet Ord. 7 p.c.	102—105	..	104
300,000	1	Oct. 13	1/7½	1/7½	Bombay, Ltd.	21/6—23/6	..	..
170,000	10	Aug. 25	8½	8½	Bournemouth 5 p.c.	12½—13½	..	..
600,050	10	,,	7	7	Do. B 7 p.c.	15—19½	..	..
275,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11½	..	..
50,000	Stk.	June 29	3	3	Do. 3 p.c. Deb.	56—68	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78	..	..
357,900	,,	Aug. 26	—	7½	Brighton & Hove 6 p.c. Con.	109—112	+1	..
341,800	,,	,,	—	6/8/6½	Do. 5 p.c. Con.	98—101	+2	..
1,287,500	,,	July 28	5	5	Bristol 5 p.c. max.	87—88a	..	..
855,000	,,	Sept 29	7	8	British Ord.	109—112	..	111½—112
100,000	,,	June 29	7	7	Do. 7 p.c. Pref.	114—117	..	..
130,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	74—77	..	..
200,000	,,	,,	—	33/2	Do. 5 p.c. Red. Deb.	95—98	..	..
100,000	10	Nov. 24	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Oct. 27	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 29	4½	4½	Do. 4½ p.c. Deb.	70—75a	..	..
696,880	,,	July 28	6	6	Cardiff Con. Ord.	100—10	..	100½
237,860	,,	June 29	7½	7½	Do. 7½ p.c. Red. Deb.	103—106	..	..
157,150	,,	Aug. 11	6½	5	Chester 5 p.c. Ord.	87—92b	..	..
79,185	1	Oct. 13	†2/-	†2/-	Colombo Ltd. Ord.	31/—32/-	+3/-	33/6
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
321,490	1	Oct. 13	1/9½	1/9½	Colonial Gas Assn. Ld. Ord.	24/—26/-	..	..
178,900	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	..
2,073,280	Stk.	July 14	—	5	Commercial Ord.	92—94	..	93—94
475,000	,,	June 16	3	3	Do 3 p.c. Deb.	56—59	..	57½—58½
800,000	,,	Sept. 29	†1	†1	Continental Union, Ltd.	28—33	..	30
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	87—92	..	..
787,560	,,	Aug. 11	6½	6½	Croydon sliding scale	98—101	..	..
408,100	,,	,,	5	5	Do. max. div.	80—83	..	81½—82½
492,270	,,	Aug. 25	9	6	Derby Con.	108—105a	..	..
55,000	,,	June 29	4	4	Do. Deb.	78—75c	..	..
209,000	,,	Aug. 25	5	5	East Hull Ord. 5 p.c.	78—81	..	..
50,000	,,	June 16	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
1,002,180	10	Sept. 29	†3	†4	European, Ltd.	73—81	+½	73—81
8,747,460	Stk.	July 28	5	5	Gas Light & Coke 4 p.c. Ord.	87—89	−1	86½—88½
2,000,000	,,	,,	3½	3½	Do. 3½ p.c. max.	62—64	+1	62—62½
4,137,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	76—79	..	77—79
5,602,620	,,	June 16	3	3	Do. 3 p.c. Con. Deb.	60—62	..	60¼
181,815	,,	,,	6	6	Do. 6 p.c. Br'tf'd Red. Db.	102—105	..	..
1,643,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—101	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Aug. 25	6½	6½	Hastings & St L. 6 p.c. Conv	88—91	..	..
258,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	72—75	..	..
70,000	10	Oct. 13	†10	†10	Hongkong & China, Ltd.	13—18	..	..
173,300	Stk.	Aug. 25	5	5	Hornsey Con. 5½ p.c.	73—76	..	..
1,976,000	,,	Nov. 10	10	10	Imperial Continental Cap.	141—144	..	141½—145
223,130	,,	Aug. 11	8½	8½	Do. 8½ p.c. Red. Deb.	68—70	..	..
235,242	,,	Aug. 11	6½	7	Lea Bridge 5 p.c. Ord.	94—97	..	..
2,145,907	,,	Aug. 11	5½	5½	Liverpool 5 p.c. Ord.	88½—89½b	..	..
600,000	,,	Sept. 29	7	7	Do. 7 p.c. Red. Pref.	101—103b	..	..
165,786	,,	Aug. 25	8	9	Maidstone 5 p.c. Cap.	107—112	..	..
75,000	5	June 16	†7	†8	Malta & Mediterranean	5½—6	..	..
541,920	Stk.	Nov. 24	†7	†5	Montevideo, Ltd.	89—91	..	..
2,061,815	,,	July 28	5	5	Newcastle & Gateshead Con.	77½—78½d	..	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref.	67½—68½d	..	..
691,795	,,	June 29	8½	8½	Do. 8½ p.c. Deb.	66½—67½d	..	..
131,788	,,	Aug. 25	—	6/18/0	North Middlesex 6 p.c. Con.	93—96	..	..
800,000	,,	Nov. 24	7	9	Oriental, Ltd.	105—110	+6	..
188,130	,,	June 21	7½	7½	Plym'th & Ston'house 5 p.c.	105—110	..	..
414,560	,,	Aug. 25	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	102—105	..	..
336,782	,,	,,	5	5	Do. 5 p.c. max.	76—79	..	..
2,389,909	1	—	—	—	Primitiva Ord.	19/3—20/3	—/6	19/6—20/3
382,300	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	86—89	+3½	84½—88
600,000	Stk.	July 28	4	4	Do. 4 p.c. Red. Deb. 1911	73—75	..	..
434,968	,,	June 29	—	4	Do. 4 p.c. Cons. Deb.	73—75	..	..
150,000	10	Sept. 29	6	6	San Paulo 6 p.c. Pref.	8½—8¾	+¼	8½—8¾
135,000	50	June 29	5	5	Do. 5 p.c. Red. Deb.	47—49	..	..
270,000	Stk.	Sept. 8	5½	5½	Sheffield A	102—104e	..	..
419,968	,,	,,	5½	5½	Do. B	102—104e	..	..
1,047,000	,,	,,	5½	5½	Do. C	102—104e	..	..
90,000	10	May 26	4	6	South African	4—6	..	..
6,809,895	Stk.	Aug. 11	7	5	South Met. Ord.	102—104	..	102¼—103½
500,000	,,	—	—	—	Do. 6 p.c. Irred. Pf.	110—118	..	..
1,895,445	,,	July 14	3	3	Do. 3 p.c. Deb.	59—62	..	60—60¾
784,000	,,	Sept. 8	6½	6½	Do. 6½ p.c. Red. Db.	102—104	..	..
91,500	,,	Aug. 11	8½	8½	South Shields Con.	101—103d	..	..
1,348,795	,,	July 28	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	..
368,837	,,	June 16	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Sept. 8	5	5	South'mpton Ord. 5 p.c. max.	75—78	..	..
121,275	,,	June 29	4	4	Do. 4 p.c. Deb.	73—76	..	..
250,000	,,	Aug. 25	7	7	Swansea 7 p.c. Red. Pref.	103—106	..	..
200,000	,,	June 16	6½	6½	Do. 6½ p.c. Red. Deb.	100—103	..	102
150,000	,,	July 28	7½	7½	Tottenham District A 5 p.c.	105—108	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	89—92	..	92
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	97—100	+2	..
181,255	,,	Dec. 6	4	4	Do. 4 p.c. Deb.	73—76*	+1	..
258,261	,,	Sept. 29	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
283,094	,,	Aug. 25	6½	6½	Do. 5 p.c. pref.	88—88	..	88½
82,330	,,	,,	5	5	Wandsworth, Wimbledon, and Epsom—			
80,000	,,	July 14	8½	8½	Wandsworth A 5 p.c.	125—130	..	127
267,686	,,	,,	7	7	Do. B 3½ p.c.	105—110	..	107½
432,585	,,	,,	5/19/0	5/19/0	Do. C and New	90—95	..	..
362,000	,,	,,	6½	6½	Do. Wimbledon 5 p.c.	100—105	..	101—101½
96,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	107—112	..	109½
200,000	,,	,,	5	5	Do. 5 p.c. Pref	85—90	..	..
88,416	,,	June 29	3	3	Do. 3 p.c. Deb.	56—59	..	57½
224,743	,,	,,	4	4	Do. 4 p.c. Deb.	74—77	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle e.—Sheffield. * Ex. div. † Paid free of income-tax. ‡ For year.

On Monday, Alliance and Dublin 91½, 92, Commercial 93, 94, 3 p.ct. debenture 57½, Gas Light and Coke 87, 87½, 87¾, 88, 3½ p.ct. maximum 62⅞, 4 p.ct. preference 77, 79, 3 p.ct. debenture 60¾, Primitiva 19s. 6d., 19s. 8¾d., 19s. 9d., 20s., 20s. 3d., 4 p.ct. 1st debentures 84½, South Metropolitan 102½, 103, 103½, Tottenham "B" 92, Uxbridge 5 p.ct. preference 85½. Supplementary prices, Wakefield 5 p.ct. maximum 71½, 72, 5 p.ct. standard 82, 82½.

On Tuesday, Aldershot 70, Colombo, 33s. 6d., Commercial 94, 3 p.ct. debenture 57½, Croydon maximum dividend 81½, Gas Light and Coke 87, 87½, 4 p.ct. preference 77½, 77¾, Imperial Continental 141½, Primitiva 19s. 7¼d., 19s. 9d., 19s. 10¼d., 20s., 20s. 1¼d., 20s. 3d., 4 p.ct. 1st debenture 88, South Metropolitan 102⅜, 102½, 103, 103⅜, Uxbridge 5 p.ct. preference 85½. Supplementary prices, Bournemouth 7 p.ct. debenture 103, 103½.

On Wednesday, Aldershot 70⅜, British 111½, 112, Commercial 3½ p.ct. debenture 58½, Croydon maximum dividend 82½, Gas Light and Coke 86⅞, 87, 87½, 88, 3½ p.ct. maximum 62, 3 p.ct. debenture 60¾, Imperial Continental 142, 142½, 143, 144, Primitiva 19s. 6d., 19s. 7½d., 20s., 20s. 1⅛d., San Paulo 6 p.ct. preference 8⅝, Swansea 6½ p.ct. debenture 102, Wandsworth "A" 127, "B" 107½, Epsom stock 109½, 3 p.ct. debenture 57½. Supplementary prices, Croydon 4 p.ct. debenture 77½, 77⅝, 7 p.ct. debenture 102, Folkestone 78½, 79, Southend 5 p.ct. 83½, new "B" 81.

On Thursday, Alliance and Dublin 92, 4 p.ct. debenture 65½, Commercial 93⅜, European 8½, Gas Light and Coke 87½, 88, 88½, 88⅜, 88⅝, 3½ p.ct. maximum 62⅜, 62½, Imperial Continental 143, Primitiva 19s. 6d., 19s. 7½d., 19s. 9d., San Paulo 6 p.ct. preference 8½, South Metropolitan 102½, 102⅜, 3 p.ct. debenture 60, 60⅜, Wandsworth, Wimbledon stock 101½, 3 p.ct. debenture 57½. Supplementary prices, Herne Bay 6¼ p.ct. preference £5 4s. 6d., 5¼.

On Friday, Aldershot 4 p.ct. preference 69, Alliance and Dublin 91½, 93 7/16, Barnet 7 p.ct. 104, Cardiff 100¼, Commercial 3 p.ct. debenture 57½, 58⅜, Continental Union 30, European 7⅞, Gas Light and Coke 88⅛, 88½, 88⅜, 3½ p.ct. 62½, 4 p.ct. preference 77½, 78⅛, Imperial Continental 143, 143½, 145, Primitiva 19s. 6d., 19s. 9d., South Metropolitan 3 p.ct. debenture 60, Wandsworth, Wimbledon stock 101, 101½. Supplementary prices, Exeter 5 p.ct. debenture 97, York consolidated 65¼.

In Lombard Street, while to an extent there was the usual week-end ease, money was not superabundant. It could, however, be obtained at 3½ p.ct. Fresh money was rarely advanced at a lower rate, but on Friday the rate hardened again. The Treasury Bills were allotted at a slightly higher average rate—£4 6s. 3·05d. p.ct.—being about 2d. p.ct. above the previous week's rate. The Discount Market was again quiet, there being no change in rates recorded.

In the Foreign Exchange Market, the feature of the week was the strength of Sterling, and the New York rate touched a new record—4.88⅛—since the year 1914, closing at 4.88 7/16. Of the Continental gold exchanges, German marks moved in favour of this country to 20.45½. Dutch florins were very slightly higher at 12.07½. French francs were unchanged at 124. Italian lire depreciated to 90.05; and Spanish pesetas fell to 29.50.

Silver was slightly easier, with China both buying and selling, at 26⅜d. per oz. Gold remained unchanged at 84s. 11½d. per oz. An interesting event during the week was a small shipment of Gold from America.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21. Bankers' deposit rates are 2½ p.ct. The deposit rates of the discount houses are 2½ p.ct. and 2⅝ p.ct.

Pittsburg Gasholder Accident

The President of the Equitable Gas Company (Mr. A. W. Robertson) has given orders for relief measures in connection with the recent gasholder accident at Pittsburg. Hospital bills and medical expenses for several hundred persons have been paid; and provision has been made to restore the broken furniture and damaged dwellings of 800 home owners and tenants. According to the "Gas Age-Record," the loss to the Company will be $1,500,000. A thorough investigation is promised into the cause of the disaster; and the President has made it plain that the Company will not endeavour to fix the responsibility on some underling, merely because he may happen to be in a position which would permit of such action. Mr. Robertson is quoted as saying: "We intend to shoot straight in this investigation. Regardless of the legal status of the case, we accept the human responsibility and are proceeding without red tape or needless delay to render to the sufferers all the assistance possible. Our investigation is going on, and we are working unremittingly to learn the cause of the accident; but time will be required to determine the facts, and we think the proper thing to do is to act now, restoring the ruined homes and assisting the injured."

Showroom for Batley.—The Batley Town Council, on Dec. 1, approved a Gas Committee recommendation for the erection on the Ward's Hill estate of a two-storey building to be a gas appliances showroom, at an estimated expenditure of £2500.

Gas Explosion at Birmingham.—As the result of a gas explosion in a private house at Aston, Birmingham, Daisy Wilson was admitted to hospital. A defective gas pendant was discovered in the hall; and it is believed that gas escaped from this.

Matlock Gas Prices.—The Matlock and District Gas Company have reduced the price of gas by 6d. per 1000 c.ft. for lighting, and 5d. per 1000 c.ft. for power, from Dec. 31 next. The new price, 4s. 4d. per 1000 c.ft., is the same as was in operation before the coal stoppage.

Reduction in Price at Newcastle.—The Directors of the Newcastle-upon-Tyne and Gateshead Gas Company have decided that a reduction in the price of gas of ½d. per therm (1d. per 1000 c.ft.) shall take place from the readings of the meters this month. The price will then be less than it was before the mining dispute last year.

Bognor Capital Issue.—Tenders sent in for the £20,000 of new consolidated stock offered by Messrs. A. & W. Richards on behalf of the Directors of the Bognor Gas and Electricity Company amounted to £30,995, ranging from £106 5s. per £100 down to the minimum of par. The average price obtained was £102 1s. 4d. p.ct.

Gas-Works as Casual Wards.—In the "JOURNAL" last week (p. 698) a paragraph appeared under this heading. It was received from a local news contributor; but we are informed that, though the information appeared in a local newspaper, it is a piece of gross exaggeration. In other words, imagination and not fact originated the story.

Rust Causes a Gas Stove Fatality.—Facts elicited during an inquest at Westminster went to show that a gas stove in a small bedroom at the Cavendish Hotel, Jermyn Street, caused the death of George Thomas Nevard, a rifleman in the 2nd Battalion King's Royal Rifles, stationed at Aldershot. The stove was used in a room without a flue or fireplace, and with windows closed; and was in a rusty condition. A verdict of "Accidental death" was returned.

Lurgan Gas Undertaking.—When the Auditors' report for 1926-27 was read before the Lurgan Urban District Council, there was shown to be a deficiency of £838 on the gas undertaking. Mr. Hopps said it was very satisfactory, in the circumstances, to get off so well, seeing that the price of gas had not been raised during the coal strike, when over £5000 extra had to be spent. The price of gas was reduced from 5s. 6d. to 5s. per 1000 c.ft., to take effect from Jan. 1.

Offer of Coke Oven Gas to Glasgow.—A letter has been received by the Glasgow Corporation Gas Committee from the Woodilee Coal and Coke Company, Ltd., stating that they propose installing coke ovens adjacent to the Corporation gas supply area, and asking if the Corporation would be prepared to enter into an agreement to purchase from the Company approximately 2½ million c.ft. of coke oven gas per day on terms to be agreed. The Committee appointed a Sub-Committee to negotiate with the Company in the matter.

Teignmouth Gas-Works Improvements.—The following tenders have been provisionally accepted by the Teignmouth Urban District Council, in connection with improvements at the gas-works, for which sanction to a loan of £10,900 is to be sought from the Ministry of Health: Condenser, washer-scrubber, meter, and gas mains, Messrs. Willey & Co., Exeter; boiler and pump, Messrs. Galloway, Manchester; and gasholder, Messrs. Robert Dempster & Sons, Elland. The foundations for the holder are to be carried out to the specification of the Gas Manager (Mr. H. Higham).

The Fatality at the Brighton Gas-Works.—Giving evidence at the inquest (when a verdict of "Death from gas poisoning by misadventure" was returned) on the body of Frederick Greenway, who died in a gasholder syphon well at the Black Rock Works of the Brighton and Hove General Gas Company, Mr. C. H. Rutter (Engineer and General Manager) explained to the Coroner that deceased was releasing the water which condensed from the gas into the well, so that it might be pumped out. When all the water which had collected in the syphon had drained into the well, the gas would follow; and it would be deceased's duty at once to turn off the cock. The instructions were that one well should be completed before another well was tackled. It seemed that deceased attempted to tackle two wells at the same time. The bravery of the fire brigade was acknowledged by the Coroner and by Mr. P. E. Browne (Distributing Engineer).

Chapel and Whaley Gas Company.—The annual report of the Chapel and Whaley Gas Company shows a profit for the past year of £4106; and the Directors recommend a dividend at the rate of £7 1s. p.ct. (less tax), the same for the preceding year. The amount to carry forward will be £3168. The income of the Company for the year totalled £21,749.

Buxton Gas Undertaking.—Alderman A. Wall has been re-elected Chairman of the Buxton gas undertaking, and Councillor A. J. Potter Vice-Chairman, for the ensuing year. The Borough Council have received a report from the Gas Engineer, Mr. F. G. Shaw, that it is necessary to instal a gas booster at the works; and they have resolved to accept the tender of Messrs. Bryan Donkin & Co., Ltd., of Chesterfield.

Gas and Electricity at Deal and Walmer.—In the "Deal, Walmer, and Sandwich Mercury" for Saturday, Dec. 10, is an announcement of the inauguration of a public electricity supply in Deal and Walmer on Dec. 1. The price of the current is, it is believed, 8d. per unit. The Deal and Walmer Gas Company signalized the inauguration by creating two records of gas output. For the week ended Dec. 9, the output was 4,396,000 c.ft. (9·9 p.ct. above the output for the corresponding week of last year). The maximum day's output was 684,000 c.ft., being 3·6 p.ct. above the previous maximum, which was on Dec. 24, 1925.

New Showrooms of the Liverpool Gas Company.—The "Liverpool Post and Mercury" for Nov. 28 speaks of the pleasure and profit to be derived from an inspection of the Liverpool Gas Company's fine new showrooms at their Duke Street headquarters. The following is extracted from a description of the new premises in the paper to which reference has been made: For the purpose of the showrooms, the internal economy of the front half of the building has been remodelled. Formerly the halls on the two sides of the central space at the entrance were separated therefrom by walls. These have been removed, so that upon entering the building the visitor finds himself in a spacious hall extending across the whole front of the offices. On the right is a lofty space beautifully panelled in Austrian oak; the original fluted stone columns being coloured to harmonize perfectly with their new surroundings. Here is a really charming display of gas fires and wall and ceiling lights. Across the entrance hall, in the companion department, domestic heating and cooking appliances are arranged. Thus, in these two wings the lover of domestic comfort and the wise believer in economy in the home and in business may see the latest results of scientific research applied to the saving of time, labour, and expense in lighting and heating, and, not least, to the promotion of health.

Industrial Accidents.—An interesting all-British industrial safety film has been completed by the National Employers' Mutual General Insurance Association, Ltd., of 8-10, Brown's Buildings, St. Mary Axe, London, E.C., who have produced it for exhibition at works entertainments or in works canteens during the dinner hour. Little preparation is necessary. The film, with or without a complete portable cinematograph apparatus and an operator, is available to any industrial organization. It is pointed out that, whatever may be the merits or demerits of films as a means of entertainment, there can be no doubt about their value as educational media. This has been well established by the success of the Association's previous efforts in this direction. It has been proved that at some stage in every industrial accident prevention campaign general interest among employees begins to wane; and some innovation is necessary to re-stimulate enthusiasm. There are many sound and practical schemes applicable at such a time; but, particularly at the early stages of a campaign, there are few ideas as likely to appeal to the average employee as the idea of the exhibition of a film, by special arrangement of his management. The film in question—entitled "A Chapter of Accident"—is the first of its kind in this country, and illustrates the adventures of two staunch pals, Jim Reckless and Tom Prudent. The characters of these two friends are as their names imply; and the incidents depicted in the unfolding of the tale are intensely realistic.

Among the attractive features at a Trades Exhibition in the Blackburn Public Halls is a section devoted to gas appliances, arranged by the Blackburn Corporation Gas Department.

At the Birmingham Police Court, George Clayton, a gas fire fitter, was fined 40s. for improperly using gas at his house. For the Corporation, Mr. Digby Seymour stated that Clayton had improperly used gas through an illegal connection to the service. It was urged on behalf of Clayton that he had been severely punished for yielding to temptation; for he had lost his position, and was not allowed any unemployment pay.

The Power Gas Corporation, Ltd., who are the gas producing and bye-product plant specializing side at the Parkfield Works of Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees, have taken over the Imperial Boiler Works of Messrs. Thomas Sudron & Co., Ltd. The Imperial Works, which are very near the Parkfield Works, have been taken over by the Power Gas Corporation to increase their constructural engineering facilities; and the plant will be adapted to their requirements.

A fire broke out on Dec. 9 in the oil tanks at the tar distillation plant of Messrs. J. & J. Charlesworth, Robin Hood Coke Oven Works, near Wakefield. It was discovered in the early afternoon, and was quickly blazing in six open tanks, each containing about 1000 gallons of creosote. Several of the tanks involved in the fire exploded, causing firemen and spectators to scatter. The actual structural damage, however, was comparatively slight; and the outbreak was subdued in a couple of hours. A spark from a passing railway engine is thought to have caused the fire.

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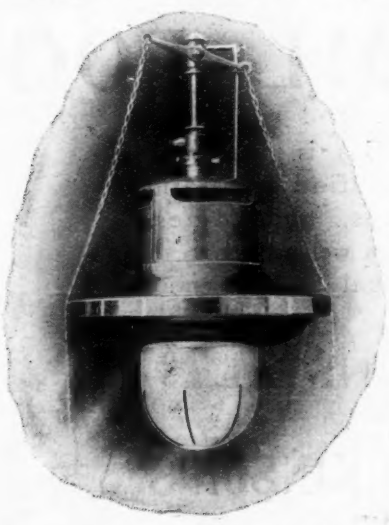

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